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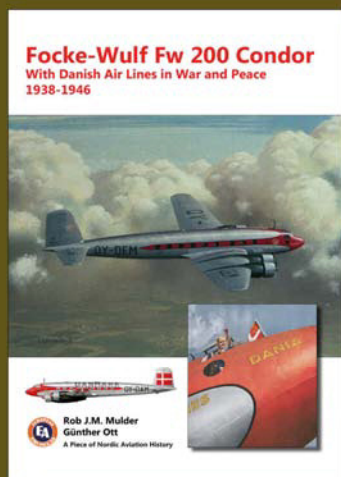
The modern journal of classic aeroplanes and the history of flying

***A-Hunting we will go...***



***issue no 6***

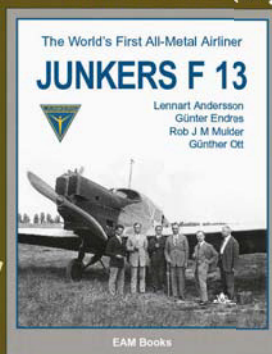
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Published by:  
The Aviation Historian  
PO Box 962  
Horsham RH12 9PP  
United Kingdom

Subscribe at:  
[www.theaviationhistorian.com](http://www.theaviationhistorian.com)

**ISSUE NUMBER 6**  
(published January 15, 2014)



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Published quarterly by *The Aviation Historian*,  
PO Box 962, Horsham RH12 9PP, United Kingdom

© *The Aviation Historian* 2014  
ISSN 2051-1930 (print)  
ISSN 2051-7602 (digital)

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# The Aviation Historian®

The modern journal of classic aeroplanes and the history of flying

## Editor's Letter

A HEARTY WELCOME to Issue No 6 of *TAH*, the first in this significant year which marks a century since the onset of the "war to end all wars". I'm sure 2014 will be a time of much reflection with, no doubt, much to learn.

While this issue has the usual eclectic mix of all eras and branches of aviation, the elements that have certainly been an education for me concern the earliest pioneers. Having often felt daunted by the arcane intricacies of pre-World War One flying, I've gained a fresh insight via some newly-rediscovered first-hand recollections by some of Britain's most illustrious air pioneers (see page 38). Collected by fellow founding-father F.W. Merriam in the 1950s and published here for the first time, they have been a revelation. The stories told by those magnificent men contain all the classic ingredients of the best aviation adventures — personal endeavour, hardship, jeopardy, triumph — but they did it first, and had to work it all out as they went along.

With the Great War quite rightly being everywhere in this centenary year, we plan to bring you some of the lesser-known aviation aspects of the conflict, beginning with Guy Ellis's account (see page 108) of the copious difficulties facing No 26 (South Africa) Sqn RFC in a forgotten corner of Africa. Over the top we go...

**FRONT COVER** *The tail of one of Hunting-Clan's pair of Douglas DC-6s spikes an (almost) gin-clear sky in Salisbury, Rhodesia, in the late 1950s. Former air hostess Angela Waller's memories of flying Hunting-Clan's Safari Services begin on page 62.* BRIAN ROBBINS

**BACK COVER:** TOP LEFT *The first prototype Potez 840 at Paris Air Salon in 1961;* TOP RIGHT *A Grumman F9F-2 Panther aboard USS Boxer in 1951;* MAIN IMAGE *T.W.K. Clarke, who made a Short-Wright glider for pioneer Alec Ogilvie, whose memoir starts on page 38.*

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# AIR

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### Letters to The Editor



**LEFT** The wreck of a Pilatus Turbo Porter (possibly XW-PCC) photographed by ARB surveyor Cyril Wray at H'Ku in Thailand in 1965–66, in company with local Miao (Hmong) people. See the letter from John Havers on this page.

### A glimpse of a secret war

**SIR** — My one-time colleague Cyril Wray gave me, many years ago, the accompanying photograph — and fortunately I kept some notes of what he said at the time, which explains the background story.

As an Air Registration Board (ARB) surveyor based in Hong Kong, Cyril had — within his varied duties — insurance surveys following aircraft accidents, among which were those suffered by Bird & Son [*rivals to Air America, the CIA's "secret airline" — see Anything, Anywhere, Anytime: Professionally, TAH2 & TAH3 — Ed*] who operated in Laos, Cambodia and Thailand. In this case a Lao-registered Pilatus PC-6 Turbo Porter had crashed within the Golden Triangle at H'Ku, a strip cut on the hillside of the Thai side of the Mekong River sometime in 1965–66, precise date or registration unknown (XW-PCC on March 21, 1965, has been suggested). To get to H'Ku Cyril went via Bangkok to Vientiane and then by Twin Pioneer with Pete, who was Operations Manager of Bird & Son, and Cye Ingalls, its Chief Engineer, to a strip on the Lao side of the Mekong River. Here they sat for some six hours awaiting the arrival of a large American piston-engined helicopter for a trip of about 25min.

On arrival they found nothing there except the crashed Turbo Porter, an American missionary named Fred Penny and some members of the local Miao tribe to whom he was teaching agriculture from a tent made out of a parachute. Crash investigation over, there was then another wait on the offchance of a passing helicopter, which fortunately soon came, for an eventual return to Vientiane.

**John Havers** Honiton, Devon

### Pup's pedigree

**SIR** — Reference the short article on Sopwith Pup G-EAVX (*Before & After, TAH5*), I have often puzzled about the provenance of this airframe, since the story behind its discovery has never been explained. While it was still with Grahame-White at Hendon in 1922 when its wings were purchased by P.T. Capon to be used on his Pup G-EBAZ, the 50-year gap in its history remains mysterious. Indeed, the present owner, Kelvyn Baker, has never expanded upon just where he found it in "Dorset", nor how it got there. I have also never seen any photographs published as to its state when found, which one would have expected for such a rare artefact. Perhaps some reader, or indeed the owner, might wish to add to the story.

I can flesh out its early history: G-EAVX was not registered by the Aircraft Disposal Co as suggested but first by Fg Off Aubrey Robert Maxwell Rickards of Fairford, Gloucestershire, on November 2, 1920, he having bought it from ADC a month or two earlier. He and his Air Pilotage School colleague, the Norwegian pilot Flt Lt Tryggve Gran, had bought two Pups (Gran's was G-EAVW) to fly to Norway for Christmas. Setting out from RAF Andover in November 1920, they forced-landed at Margate owing to bad weather but later made it up as far





Send readers' letters for publication to: Air Correspondence, *The Aviation Historian*, PO Box 962, Horsham RH12 9PP, UK, or (preferably) e-mail them to the Managing Editor at [mickoakey@theaviationhistorian.com](mailto:mickoakey@theaviationhistorian.com)

as Newcastle before they decided to abandon the flight and catch the ferry instead! In January 1921, having celebrated Christmas, they returned to Newcastle and flew the Pups back to Andover. The subsequent "crash" at Hendon during the Aerial Derby was not serious; a contemporaneous report has it as groundlooping on landing and ending up on its nose when the pilot abandoned the race at the end of the first lap. It was certainly not "written-off" — its registration simply lapsed after one year because it had no C of A.

**Malcolm Fillmore** *via e-mail*

## Speed solecism

**SIR** — A small correction to the otherwise excellent article by Jonathan Pote on the Vulcan trip "down under" in 1959 (*A Close Shave at Wellington*, TAH5):

On page 105, the exceptionally fast Atlantic crossing by Vulcan XH502 is reported, with a groundspeed as high as 720 m.p.h., which the author equates to Mach 0.945. This is not correct, as Mach number is the ratio of airspeed (not groundspeed) to the velocity of sound: this means that, if the aeroplane kept its customary long range cruise Mach No of 0.84 at 37,000ft or above (i.e. an airspeed of 555 m.p.h.), the stated groundspeed was attained with the hefty push of a jetstream tailwind of 165 m.p.h. (or, with a

better definition, of 143kt), a not uncommon occurrence in November on the Atlantic.

**Giulio Valdonio** *Milan, Italy*

[Many thanks for the correction, Giulio. We must take more water with it when proofreading — Ed]

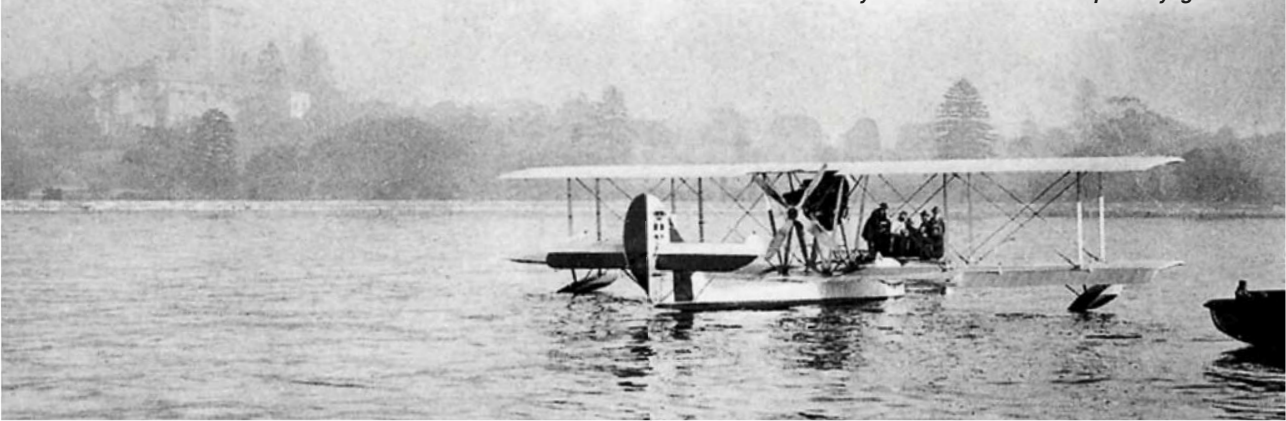
## Mixed messages

**SIR** — In 1949 the Royal Navy decided to change the Deck Landing Control Officer's (DLCO) signals to conform to the US Navy's version, as they had a few more carriers than us and it would make cross-operating much easier. Some top brass, sitting in his armchair, must have had a laugh — I had just finished three months at RNAS Eglinton in 768 Sqn, as a "clockwork mouse", training a bunch of DLCOs on the RN system, and then moved to RNAS Culdrose to join No 802 Sqn (Sea Fury) only to be told that our system was to change, forthwith.

A USN lieutenant appeared, to train 12 somewhat hostile pilots on the system. There were two parts: the signals themselves and, more importantly, the method of approach to the flightdeck.

The Signals: The ones illustrated in my article *Taking the Seafire to Sea* in TAH4 [see overleaf] have somewhat quaint titles. Our approaches were a continuous turn to port so the ones labelled "go to port", "go to starboard" should read more accurately "increase bank", "reduce

*As a postscript to our article in TAH2 on Francesco de Pinedo's long-distance flights, Phil Vabre of Melbourne-based The Airways Museum and Civil Aviation Historical Society ([www.airwaysmuseum.com](http://www.airwaysmuseum.com)) sent this photograph of de Pinedo's SIAI S.16ter flying-boat, probably taken at Sydney, during the 1925 Italy—Australia—China—Japan voyage.*





# AIR correspondence

bank". Importantly the signal UK "go down" now means US "too low" and similarly UK "go up" means US "too high". Easy, isn't it! Others were somewhat different but easily recognised, so of no great import in this letter.

The Circuit: Our steady descending turn to the deck was changed to maintaining a steady height, aimed to arrive over the round-down with wheels at around 10ft, cutting the throttle and dropping on to the deck, pulling the stick back at the *moment critique* to achieve a landing and catch a wire. This was fine for American "well built for the job" naval aircraft, but for ours with "OK for runway" type aircraft, a disaster, it seeming impossible for Messrs de Havilland, Fairey, Hawker, Blackburn, Supermarine *et al* to design a strong undercarriage.

So, our deck landing accident rate went up as, after a perfectly executed approach, undercar-

riage after undercarriage collapsed on touchdown.

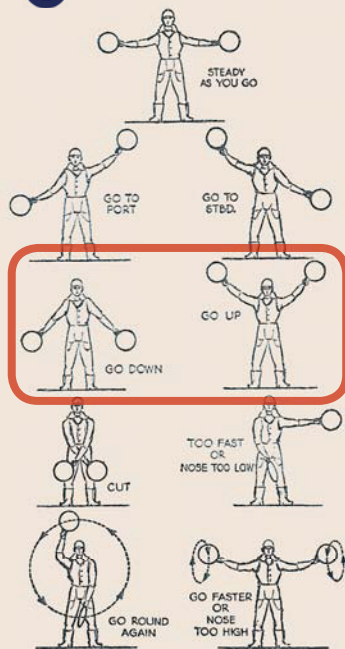
The second problem was a pitching deck. Our system of flying down to the deck gave no problem, as the aircraft either touched down earlier if the deck was up or later when the deck was down. With the American system it was easy, especially for learners, to "chase the round-down" trying to maintain a constant height above deck; this made matters worse. The joke on all of us was that with the advent of the British invention, the Deck Landing Mirror Sight, both navies reverted to the steady descent on to the deck.

Postscript: In one of the aviation magazines of the time a Dowty advertisement for undercars showed them on the aeroplane back to front! I wrote them a sarcastic letter and was sent an engraved Dowty penknife, which I still have.

David Hamilton North Rocks, NSW, Australia

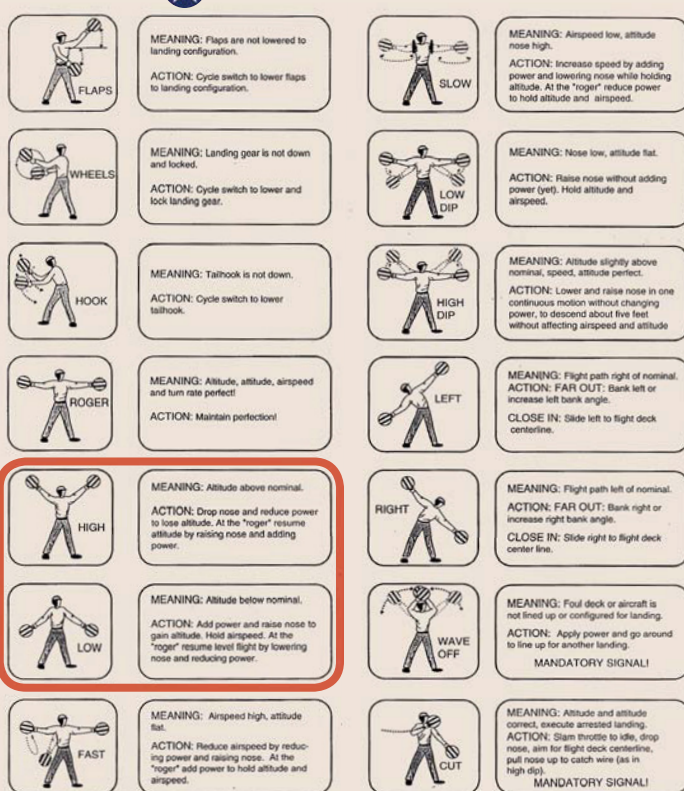
## You say Tomayto, I say Tomahto British vs American deck-landing signals

### THE BRITISH WAY...

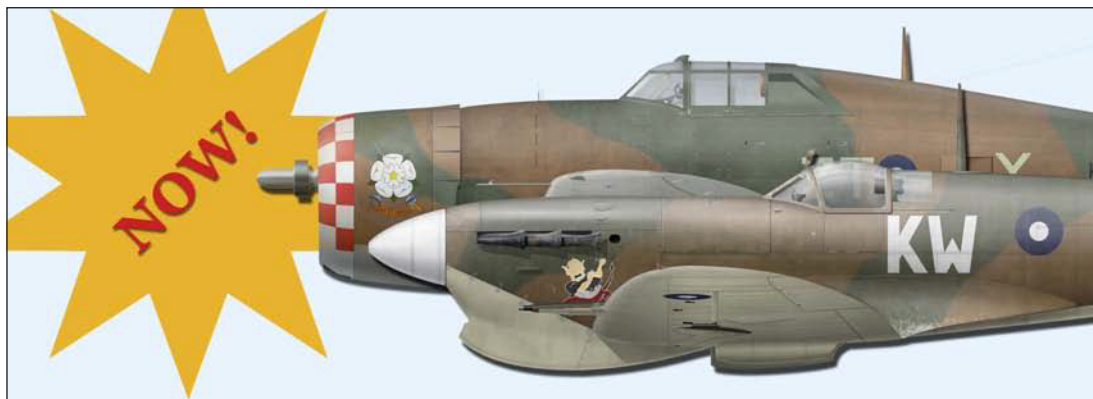


**A recipe for disaster: the red boxes on these diagrams highlight the diametrically opposite meanings of identical DLCO signals before harmonisation in 1949. See David Hamilton's letter on this page.**

### THE AMERICAN WAY...







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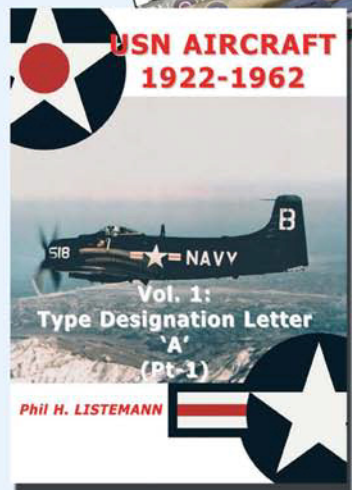
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# AIR correspondence



*Inspired by our article in TAH1 about Playboy chief Hugh Hefner's private DC-9, N950PB "The Big Bunny", reader Fred Crosskey has made this 1/144th-scale model (complete with handpainted Bunny logo) and presented it to the TAH crew. Thanks, Fred!*

## A thirst for data

**SIR** — Issue No 3 of *TAH* is a great one indeed! Especially Philip Jarrett's *Pioneering the Fighter* — it has everything a high-quality article should have: good layout (no ragged-right typesetting!), excellent content plus proper references. I also read with interest Ricardo Lezon's P-38 article (*El Relámpago en Argentina*) as it is perhaps my No 1 favourite American World War Two fighter.

The caption on page 89 states that the P-38 was "hard to maintain". This seems to be a common claim, but was it so? A British Air Fighting Development Unit report on the P-38F states that both engines and armament are easily accessible and the aircraft is easy to maintain and is suitable for operation from forward bases. The only maintenance criticism concerned radio equipment, owing to its location.

The technical data sidebar on page 93 is not completely satisfactory. I have often wondered why many excellent articles and books are compromised by unsatisfactory data summaries. First, it states the power to be 1,475 h.p. The specific engine flight chart for the V-1710-111/113 gives 1,425 h.p. for take-off at 3,000 r.p.m./54inHg boost, while the war emergency rating is 1,600 h.p. at 3,000 r.p.m./60inHg. Since the information is obtainable, I do wish that such data boxes would always give also the r.p.m. and boost figures.

Then it is stated that the "cruise speed" is 290 m.p.h. (467km/h). Which cruise speed: economical, maximum continuous or what? At what altitude? I could not find a corroboration for a 290 m.p.h. figure in the P-38L pilot manual, though the figure represents a rather high (uneconomical) cruising speed.

Then it is stated that "normal range" is 450 miles (724km). What is normal? Again the manual indicates that 450 miles is obtainable at 340 m.p.h. (547km/h) TAS at 12,000ft with maximum continuous power and internal fuel only. To put things into perspective, the maximum range at the same altitude is 1,210 miles (1,945km) at 212 m.p.h. (341km/h) TAS (also internal fuel only).

Max range is given as 2,600 miles (4,180km) on p.93, but the manual gives 2,200 miles (3,540km).

As *TAH* is very clearly above the rest in its content and execution, I wish that the common lack of engineering details on pre-jet topics is not repeated here. I often wonder why one is treated to thorough engineering details on jet aircraft and jet engines, but on piston-era aircraft we get quite vague stuff. For example, I have not seen a single book or article that gave the strength and material specifications of the alloy used for the Bf 109 (or the Spitfire if you wish) mainspar. As a warship enthusiast as well, I am amazed how much greater detail is available in common commercial publications even on ships of the sail era.

**Jukka Juutinen** Rautavaara, Finland

*[Jukka raises a worthwhile point about data tables — impeccable sources often appear to disagree on individual figures because frequently the conditions (e.g. altitude, temperature etc) of measurement are not specified. Where possible, TAH aims to provide more comprehensive data than mainstream publications — Ed]*

## A relic of the airship era

**SIR** — As a postscript to my article on the AD 1 airship (*An Airship Interlude, TAH4*), I thought you might be interested in a photograph of the Airship Development Company's shed at Cramlington, taken on January 5, 1968, just before it was demolished. There were still traces of the company name on the doors.

**Brian Turpin** Saffron Walden, Essex



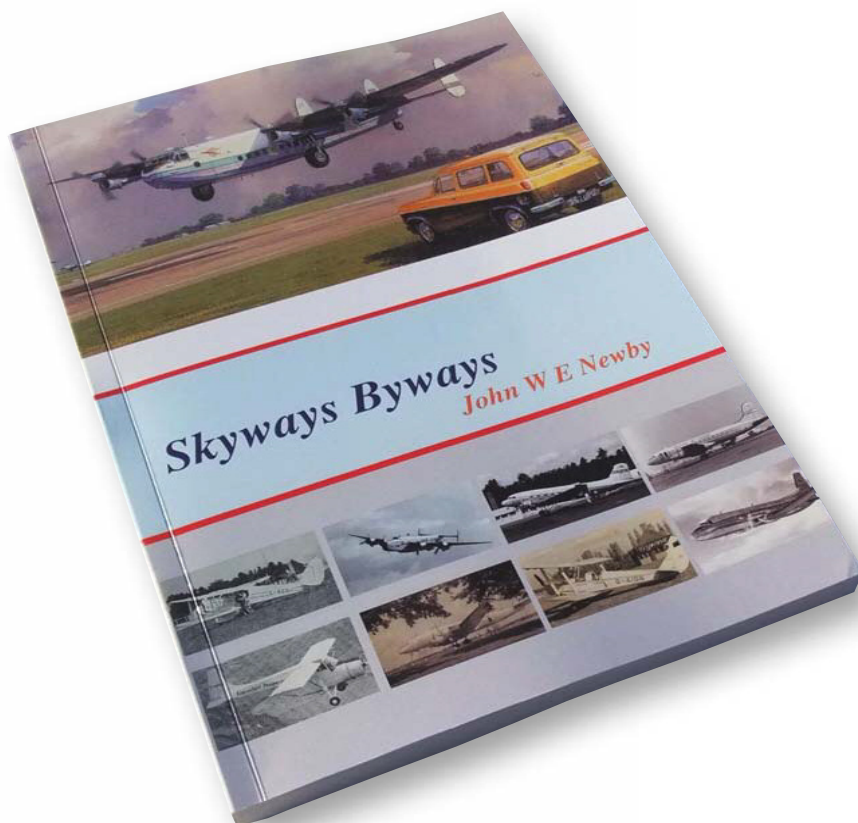
*Cramlington's ADC shed in 1968 — see letter above.*





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– **David S. Truman** (*The Avgas Dinosaur*) Aviation historian, researcher and enthusiast

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# There I was...

## Short stories from the sharp end

*In 1961 RICHARD T. RIDING was a young, enthusiastic photographer equipped with a World War Two-vintage reconnaissance camera, who wanted nothing more than to get within ear-bleeding proximity of Britain's cutting-edge Cold War hardware. That year's SBAC Show at Farnborough provided a perfect opportunity for him to get up close and personal with the mighty Victor*



**I**N SEPTEMBER 1961, aged 19, I felt privileged to be standing with my toes touching Farnborough's runway during that year's SBAC Show, while the cream of Britain's aircraft industry was being put through its paces by pilots whose names have since passed into legend. I felt self-conscious holding my black, bulky, ex-USAF Fairchild K.20 aerial camera, pretending to ignore the stares of disbelief and shaking heads from other photographers who could be forgiven for thinking that I was clutching a megaton bomb launcher. My camera had a fairly wide-angle lens which was fine for photographing the big stuff or formations of aircraft, but was somewhat useless for anything smaller than a Handley Page Victor. Talking of which, I managed to capture the great white futuristic A-bomber, in the shape of B.2 XL164,

with everything dangling, following a memorable and sprightly demonstration by either John Allam or Peter Baker, who were sharing the Victor display flying over the week.

Victors were a familiar sight for me. I worked as an aerial photographer at Elstree aerodrome, only a stone's throw from Radlett where Victors were air-tested. Anybody airborne from Elstree hearing a radio call from "Chock Ice Charlie" immediately made themselves scarce; it meant that a Victor was either taking off or landing at Radlett.

After a spell at the A&AEE, XL164 was converted to a K.2 tanker and served with Nos 57 and 55 Sqns before becoming 9215M at RAF Brize Norton, where it was broken up in December 1995. All that survives today of this menacing but beautiful bird is its nose, recently acquired by the Bournemouth Aviation Museum.



*The author's deafening photograph of Handley Page Victor B.2 XL164 coming in to land after a sparkling display at the 1961 SBAC Show at Farnborough. Lined up in the background are the nine English Electric Lightnings of No 74 Sqn, which, led by Sqn Ldr John Howe, dazzled the crowd with a formation take-off with full reheat, followed immediately by a vertical climb.*



# SWEDEN'S MIDNIGHT MOSQUITOES

*One of a consignment of six Mosquito NF.19s for the Swedish Air Force (Flygvapnet) departs Hatfield on the first stage of its delivery flight on February 26, 1949. The first example had been delivered in July 1948, and a total of 60 were to arrive in Sweden by November 1949. Somewhat spoiling the Mosquito's usually graceful profile, the nightfighter's "bull" nose housed the all-important AI Mk X airborne interception radar equipment.*

BAE SYSTEMS





In the first half of a two-part section on Sweden's use of the ubiquitous de Havilland Mosquito, **JAN FORSGREN** chronicles the career of the “wooden wonder” as Flygvapnet's first night-fighter, while on page 21 former Swedish Mosquito pilot **BENGT LINDWALL** relates what the much-loved but flawed nightfighter variant was like to fly — and recalls a dramatic nocturnal aerial encounter with a Soviet *Bull*

**O**NE OF THE most ubiquitous Allied warplanes of the Second World War, de Havilland's “wooden wonder”, the Mosquito, has two significant connections to Sweden. The most well-known of these is BOAC's wartime use of the aircraft as a high-speed transport on the vital route between Scotland and Sweden, carrying VIPs, diplomatic pouches and ball-bearings for the Allied war effort. As an aside, some 20 Mosquitoes (including one USAAF F-8 photographic reconnaissance variant) made unscheduled arrivals in Sweden. After the war, several of the interned RAF Mosquitoes were sold to Swedish civilian company *Svensk Flygtjänst AB* (Swedish Air Service Ltd) for spares recovery.

The second and much less well-known Swedish connection began in 1948, when *Flygvapnet* (Swedish Air Force) acquired 60 Mosquito NF.19s (the original Latin numerals, e.g. NF.XIX, were changed in 1948 to Arabic numerals) as the Service's first nightfighter. Until the introduction of the Mosquito, nightfighting operations had never been part of Flygvapnet operations. (The first Flygvapnet aircraft to carry an airborne radar was its sole Handley Page Hampden, which, during 1944–45, was fitted with experimental Swedish-designed radar equipment.) In Flygvapnet service, the Mosquito was given the designation J 30 (J for *Jaktflygplan*, fighter aircraft), and remained in service until 1955.

### NIGHT CAPABILITY

In early 1948, it was decided to re-establish Wing F 1, based at Västerås-Hässlö in central Sweden, as a nightfighter unit. Tentative plans also called for five nightfighters to be operated by Wing F 16 at Uppsala, 45 miles (70km) north of Stockholm, but this was cancelled owing to a lack of available hangar space. Initially, it was planned that a nightfighting variant of the twin-engined Saab B 18B bomber would be produced, provisionally designated J 18. The radar equipment was to be obtained from abroad. However, when AI Mk X airborne radar was offered from Britain, it was found that it would be cheaper to acquire refurbished Mosquitoes than develop the



**LEFT** Flygvapnet delivery pilots pose for publicity photographs at Hatfield before ferrying the Mosquitoes to Sweden in February 1949. The first of the J 30s delivered to Sweden, 30001 (formerly TA286), was delivered in July 1948 in an overall aluminium dope scheme with black propeller spinners. Most of the remainder were delivered in the standard RAF nightfighter camouflage scheme with Swedish serials added plus the spinners and code letters in the various colours used by the three squadrons of Wing F 1 at Västerås.

**BOTTOM** Swedish Mosquitoes await their delivery flights at Hatfield. As with most export Mosquitoes, the Swedish examples were all former RAF machines bought back by de Havilland and sent to Fairey Aviation at Ringway, Manchester, to be refurbished and modified (including the replacement of three-bladed props with four-bladers) before being flown back to Hatfield for their onward journey.

B 18B into a nightfighter. Accordingly, on July 20, 1948, a contract for the supply of 60 Mosquito NF.19s to Sweden was signed. Interestingly, the first of these, formerly TA286 in RAF service, had already arrived in Sweden four days previously!

More than half of the Mosquitoes — 34 in total — had seen operational service with the RAF, with 25 of them having accumulated some 600 flying hours. Several had been used by the RAF's first Mosquito nightfighter unit, No 157 Sqn, which had claimed numerous Luftwaffe aircraft destroyed during the closing stages of the war. One former 157 Sqn aircraft, TA401 (coded RS-D), had shot down two Junkers Ju 88s and at least one Messerschmitt Bf 110 during November–December 1944. Indeed, on arrival in Sweden several of the Mosquitoes carried small swastika

victory markings, including one (the serial number of exactly which one is unfortunately unknown) carrying seven such victory symbols.

## INTO SERVICE

All the Mosquitoes destined for Sweden were bought back from the RAF by de Havilland and refurbished before delivery, four-bladed props being fitted and new serial numbers, 30001 to 30060, being allocated. Unfortunately, no complete official list of tie-ups between RAF and Flygvapnet serial numbers exists (those that are known are listed on page 25).

Technical problems, both major and minor, soon became apparent: the electrical wiring was fitted in a haphazard way and the engine starter button was located in different places in different





*With no unit markings or serials visible, this J 30 was probably photographed while up on a pre-delivery flight from Hatfield. The NF.19 variant was powered by a pair of Rolls-Royce Merlin 25s and first flew in April 1944.*

PER BJÖRKNER COLLECTION VIA AUTHOR



aircraft, which meant that Flygvapnet crews frequently had to resort to using a torch to find the starter button. Other problems included unlocked piping joints, loose screws, dried-out rubber gaskets and wing-tank corrosion. It was obvious that the Mosquito had been a product of wartime conditions, built to last a specific number of flying hours. As well as the airframes, a considerable quantity of spares was also part of the deal.

Canadian-built Mosquitoes were offered to Flygvapnet on several occasions by the Babb Company (Canada) Ltd of Dorval, Quebec, including A506, A518, A519 and A523. Avro Lancasters were also offered but none of these offers was taken up.

As mentioned, the first Mosquito arrived in Sweden on July 16, 1948, with deliveries being completed on November 15, 1949. In order to speed up conversion training, one RAF pilot (Smythe) and navigator (Alcock) assisted the Flygvapnet crews. Navigators received their training in a converted Junkers Ju 86K (B 3 in Flygvapnet service). The B 3 had AI Mk X radar equipment (designated PS-20/A by Flygvapnet) grafted on to the nose.

The J 30 immediately proved popular with its Swedish crews. Test pilot Gösta Hedén stated that the Mosquito was "almost as good as a B 18B. Among the things most appreciated in the J 30 were the long range of the radar, and the endurance of four to five hours". During night sorties, however, the engine-exhaust flameguards were deemed unsatisfactory. As a result modified exhaust flameguards were tested, and, although better than the original guards, these were not fitted to all J 30s.

During mid-1951 consideration was given to converting at least some of the Mosquitoes to reconnaissance aircraft, but nothing ultimately came of the plan. Presumably, it was intended to retain the Mosquitoes in service even after the introduction of its intended replacement — the de Havilland D.H.112 Venom NF.51 — as photo-reconnaissance aircraft. The plans were not proceeded with, but the following year Flygvapnet obtained Mosquito spares from the Royal Norwegian Air Force (RNoAF). Reportedly, a dozen RNoAF Mosquitoes were also offered to Flygvapnet, but were declined.

### OPERATIONAL DIFFICULTIES

From the very beginning J 30 operations were the subject of severe criticism. There was a perception within Flygvapnet that the Mosquitoes were suffering from structural deficiencies, thought to be the cause of several incidents and total losses. When J 30 s/n 30038 was lost on May 5, 1949, all Swedish Mosquitoes were grounded. It was thought that the J 30 had come apart in mid-air owing either to severe airframe vibrations caused by the firing of the cannon, or high g, which led to a tailplane failure.

In the case of an emergency, J 30 crews found it all but impossible to exit the aircraft. In order to remedy this situation de Havilland was asked to design and build an ejection canopy, but, unsurprisingly, the request was turned down. In total, some 16 pilots and navigators lost their lives in J 30 accidents, with 23 aircraft (38.3 per cent) being written off in accidents. In spite of this alarmingly high accident rate, the J 30 remained a popular aircraft with the nightfighter crews, who particularly valued its high performance.



**ABOVE** Mosquito "Blue K" of Wing F 1's No 2 Sqn keeps formation with another J 30. The Wing incorporated three J 30 nightfighter units, Nos 1, 2 and 3 Sqn, each distinguished by a signature colour applied to the spinners and code letters on the fin. Initially white, No 1 Sqn's colour was ultimately red, No 2 was blue and No 3 wore yellow.

A typical J 30 incident occurred on November 14, 1950. At 2100hr pilot Sven-Olof Olson and navigator Sven-Olof Rydberg were due to take off for a night training sortie. Soon after take-off, the starboard engine started to vibrate. Olson and Rydberg elected to continue the sortie, which included performing the roles of both hunter and hunted with another J 30. After about two hours, Rydberg switched on the power for the PS-20/A radar equipment, having been the "prey" for the previous hour. A loud crackling noise was heard and Rydberg immediately turned the radar off. By this time the Mosquito had begun to weave violently through the air. A starboard turn became

uncontrollable and Olson ordered Rydberg to bale out, which he accomplished safely — a first for Flygvapnet Mosquito operations.

The vibrations reduced slightly as the speed dropped to 150kt. Prepared to bale out, Olson nevertheless chose to stay with the J 30, noticing a stream of bright light from the starboard side of the nose. On cutting the starboard engine and feathering the propeller, the vibrations almost ceased. Olson managed to make a single-engine landing at Västerås-Hässlö.

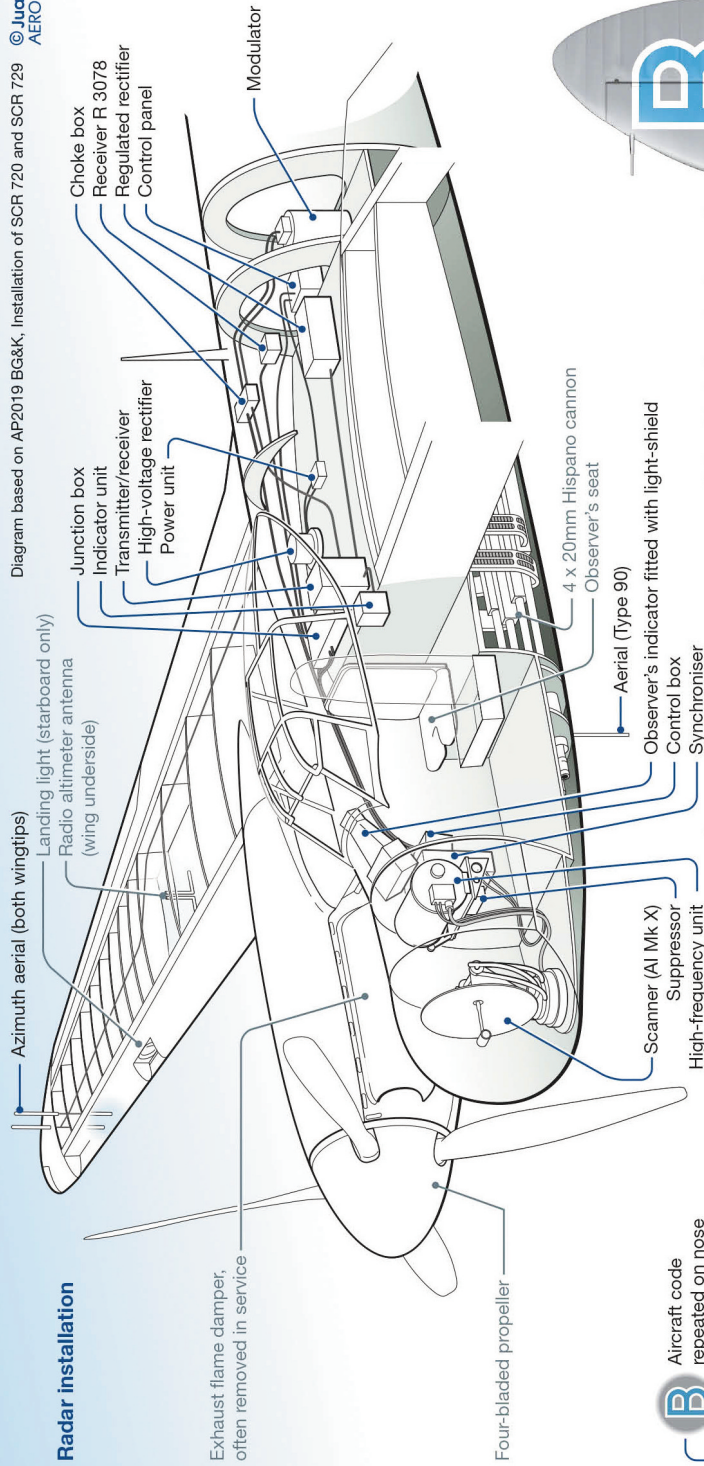
Upon examination, large cracks were found in the Plexiglas nosecone. The tilting axle of the radar antenna had come loose, with the support

**BELOW** Bearing the yellow spinners and code letter "C" of No 3 Sqn, a J 30 taxis in during a visit to Wing F 8 at Barkarby, north of Stockholm. Visible behind the Mosquito is the tail of one of the 198 Swedish-designed and -built FFVS J 22 single-engined fighters built during 1942–46, the type finally being retired from service in 1952.

PER BJÖRKNER COLLECTION VIA AUTHOR



## Radar installation

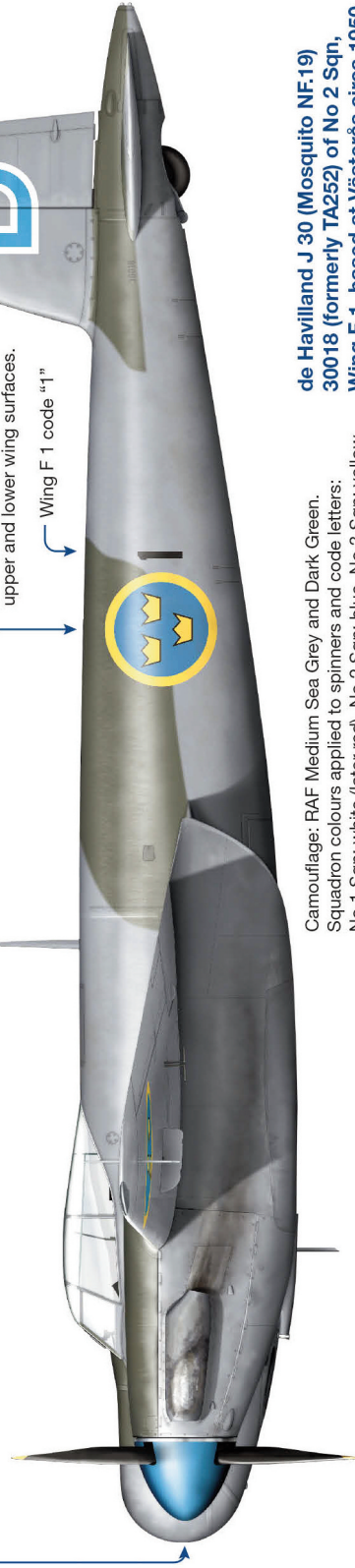


**B**

Aircraft code  
repeated on nose

National insignia on fuselage and  
upper and lower wing surfaces.

Wing F 1 code "1"



Camouflage: RAF Medium Sea Grey and Dark Green.

Squadron colours applied to spinners and code letters:

No 1 Sqn: white (later red), No 2 Sqn: blue, No 3 Sqn: yellow.

de Havilland J 30 (Mosquito NF.19)

30018 (formerly TA252) of No 2 Sqn,

Wing F 1, based at Västerås circa 1950





**LEFT** An example of the comparatively frequent fate of Flygvapnet's Mosquitoes. Following engine trouble the crew of this J 30 managed to make a forced landing at Wing F 21 at Luleå-Kallax. The airframe suffered substantial damage, however, and was struck off charge.

**BOTTOM** The "A" on the fin of this J 30, and its spinners, are probably red, making it a No 1 Sqn machine. The AI Mk X radar equipment housed in the J 30's nose had been designed by the Radiation Laboratory of the Massachusetts Institute of Technology using British cavity magnetron technology.

bar punching through the nose. The hole in the nosecone was the source of the severe vibrations, and not the starboard engine. During the flight, Olson believed that the problems were due to the seemingly errant starboard engine. If Olson had not managed to get the Mosquito back to Wing F 1 in one piece, the cause of the problem would never have been known. Olson (later C-in-C of Flygvapnet) was awarded a Gold Medal and 1,000 Kronor by the newspaper *Stockholmstidningen* for bringing the stricken aircraft back.

## ENTER THE VENOM

By early 1954 the J 30 had been superseded by the Venom NF.51 (designated J 33) in Flygvapnet service. For a brief period Wing F 1 operated both J 30s and J 33s. One J 30 — 30021 — remained in service until March 19, 1955, when it was struck

off charge as Flygvapnet's last operational piston-engined fighter.

Sadly, no J 30 was set aside for preservation. All were scrapped or consumed in firefighting exercises. During one airshow a number of redundant J 30s were used as ground targets, being reduced to ashes by attacking Flygvapnet jets. No J 30s were sold abroad.

In the late 1970s, Flygvapenmuseum at Malmö initiated a search for a Mosquito. A few parts existed in Sweden, including remains from crash sites. After some years, a deal was struck with Californian Jim Merizan, who owned former RNZAF Mosquito FB.VI PZ474. In exchange for surplus Flygvapnet jets, Merizan would restore PZ474 as a Flygvapnet J 30. This project appears to have been abandoned and the remains of PZ474 are still at Chino, California.



Another of the pre-delivery photographs of a J 30 in flight. Despite its problems in Flygvapnet service, the “wooden wonder” was well-liked by its crews for its turn of speed and agility.



VIA AUTHOR

# MOSQUITO vs BULL



## FLYING THE J 30 IN FLYGVAPNET SERVICE

When **BENGT “KÄVLINGE” LINDWALL** (seen *below* at left) was selected to fly the J 30 in 1951, it was a dream come true. He describes what the fast and agile but far-from-perfect Mosquito nightfighter was like to fly, and recalls the night he came face-to-face with a Soviet bomber high above the blazing lights of the Swedish capital



BÖRJE SAMUELSSON VIA AUTHOR

I BECAME INTERESTED IN aircraft during the Second World War, and, through various books and magazines, tried to learn as much as possible about the different combat types. The Mosquito was definitely my favourite because of its fantastic performance characteristics, and also because of the outstanding contribution it made to the Allied war effort. Little did I realise that a few years later I myself would fly this wonderful machine.

### JOINING UP

In 1950, along with around 700 other applicants, I applied to Flygvapnet for pilot training. After the very thorough screening process there were 36 of us left. On May 5, 1950, we hopefuls marched through the gates of *Krigsflygskolan* (Air Force Flying School) at Ljungbyhed. A year later, following a harsh training schedule, 18 of us had pilot's gold wings pinned to our chests. We were extremely proud, and ready for assignment to a





**ABOVE** The view from the office — No 2 Sqn's "Blue K" over a typically snowy landscape. The J 30's centimetric radar was a great improvement on early metric radar, which was non-directional and suffered from ground "clutter". Centimetric radar allowed greater range and a much improved ability to track rapidly-moving targets.

Flygvapnet wing to fly real combat aeroplanes.

Along with 11 of my colleagues, I was assigned to Wing F 1 (*Kungliga Västmanlands Flygflottilj* — Royal Västmanland Air Force Wing) at Västerås-Hässlö, the unit having operated the Mosquito since 1948. We had received twin-engine conversion training on the Saab B 18B, two of which were fitted with a second set of controls at Wing F 14 at Halmstad. By learning how to fly the B 18B, it was hoped that we would become aware of asymmetric-power handling before being permitted to fly a Mosquito. (No Mosquito T.3 conversion trainers had been purchased by Flygvapnet.)

On June 6, 1951, at the tender age of 18, I made my first solo flight in a B 18B, which was fitted with a rudimentary ejection seat. During my 42 years as a pilot, the B 18B was the only aeroplane fitted with such a device that I came into contact with. This had a particular significance later on, when I flew the Venom.

After about 50hr in the B 18B I was despatched to Wing F 1 where I quickly converted to the J 30. It was with great reverence that I walked around the aeroplane for the first time, thoroughly inspecting everything. There was an air of unparalleled British aeronautical design and memories of great wartime adventures emanating from this beautiful creation. Beneath the camouflage, I could faintly see a row of swastikas, indicating this Mosquito's wartime service. And now, having recently celebrated my 19th birthday, I was to fly this fantastic aircraft.

I distinctly remember my first take-off and landing, which could have spelled the end of my career as a Flygvapnet pilot. My flying instructor had briefed me to raise the speed to 120kt during the take-off run before lift-off. The Mosquito clearly wished to lift off at 110kt, but one had to keep it on the runway until the airspeed indicator showed 120kt. This was because the







**ABOVE** Photographed at Hatfield before delivery in early 1949, these Mosquitoes have their original RAF serials applied beneath the last two digits of their Swedish serials. The nearest here is TA353, which did not serve operationally with the RAF, becoming 30020 in Flygvapnet service. Code letters were added to the fin in Sweden.

fin was somewhat smaller than it should have been to balance the asymmetric power of the Rolls-Royce Merlin engines and their four-bladed propellers in case of an engine failure on take-off.

Happy, but extremely focused on the landing, I made, in my own opinion, a good circuit. In the corner of my eye I saw my flying instructor on the ground. When the undercarriage touched the runway, the Mosquito bounced unexpectedly high into the air. Through pure reflex I pushed the throttles forward and the aeroplane hung in the air above the concrete runway. I felt sweat running down my spine; I couldn't understand what had happened.

I recovered and carried on into a second circuit, then began my second landing attempt. The flying instructor was screaming over the radio that the moment the wheels touched the ground I had to push the stick forward. Then the

Mosquito would remain on the runway. My second landing was perfect, and after this practical lesson I never again made a bad landing, even in the worst possible conditions.

The Mosquito was, in fact, very easy to fly, with wonderfully well-balanced characteristics. The reason behind this particular landing technique was that the undercarriage dampers were of unusual construction — large pieces of rubber mounted tightly on top of each other.

### BECOMING A NIGHT-HUNTER

I soon became proficient on the Mosquito, particularly in poor weather and at night. Take-offs and landings were normally performed during the worst possible conditions, especially in winter. During the spring of 1952 I received my commission as a fully-fledged nightfighter pilot, ready to defend king and country.

The airborne radar set was good for finding possible enemy aircraft, and was operated by a radar operator/navigator, who sat to the right of me in the cockpit. After taking over from the ground radar stations, he directed me towards a good firing position behind the target. After a while, we became very proficient as night hunters. Usually, we managed to execute an attack in around 6–7min.

Our nightfighting tactic was based on that used by the RAF during World War Two. It consisted of taking off and making the initial attack in pairs. We developed it slightly by taking off in groups of four, which were then directed by ground radar stations to a position near the target or targets. Then we would break formation and find our prey separately.

One winter's day in poor weather, I was slated

**Three J 30s alongside a Flygvapnet Junkers Ju 86K (designated B 3 in Swedish service). Three B 3Ds were converted to serve as radar operator trainers in 1949, one of which was fitted with the complete nose section of written-off Mosquito s/n 30006.**

BAE SYSTEMS



to take off as No 4. The snow thrown up by the three Mosquitoes ahead of me got stuck in the wheelwell. As a result, the undercarriage remained firmly down. While turning before entering cloud, I discovered to my alarm that the port engine was on fire, with loud bangs emanating from it. By now, we were at around 1,000ft (300m) over central Västerås. There simply wasn't enough altitude to cut the burning engine and feather the turning propeller. What we needed was to gain altitude and get away from the densely populated city. My initial thought was to turn back to the airfield with the burning Mosquito, despite orders from the CO not to take any unnecessary risks. When the engine made an extra-large popping sound I ordered the navigator to bale out.

After opening the escape hatch, he jumped out of the J 30. I then noticed that the starboard mainwheel was still extended. By now, I was well out of the way of any populated areas, flying at fairly low speed at 1,500ft (460m). After another huge bang from the burning engine I decided to leave the J 30 to its fate. I was dressed in winter overalls and wearing heavy boots. I was sitting to the left in the cockpit with the parachute pushed down in the metal tub seat.

I tried to get my left leg over the control column in order to reach the escape hatch. Busying myself with this, I managed to push the control column forward, which made the Mosquito enter a dive towards the increasingly close ground. I quickly pulled back the control column and then dived out of the Mosquito. I did, however, forget to turn off the magnetos, which would have cut the engines. I landed in a snow-covered field only seconds after my parachute had fully opened. I slid on my belly, being pulled by my parachute, before being able to get up, unscathed but shaken. I then saw my Mosquito pile in some distance away. I had baled out from an altitude of only 600ft (180m). The Mosquito had continued to fly for some distance before striking the ground. My navigator did not suffer any injuries, and nothing on the ground was damaged or destroyed.

Afterwards I often thought about the accident, asking myself whether I should have attempted to reach the airfield instead of baling out. A few non-pilots later found it amusing that my Mosquito had continued to fly after I had taken to my parachute.

## A BULL OVER STOCKHOLM

Things soon became normal again. My comrades and I became more experienced each day that passed. The Commander-in-Chief of Wing F 1 told us that we could compare ourselves with the medieval knights. We would be the first to



BORJE SAMUELSSON VIA AUTHOR

**ABOVE** A Flygvapnet J 30 crew in discussion with a mechanic. Bengt Lindwall, nicknamed "Kävlinge" after his place of birth, flew the Mosquito and the de Havilland Venom in service before taking up a career as a civilian pilot. He retired from Lufthansa in 1992, after more than four decades as a professional pilot.

intercept and destroy any intruders and, following the shooting-down of one of our Douglas DC-3s and a Consolidated Canso amphibian by Soviet MiG-15s in June 1952, we were mentally prepared for combat.

Late one night, my navigator and I were ordered to take off immediately to intercept a Soviet Tupolev Tu-4 *Bull* (a reverse-engineered Boeing B-29 Superfortress) which was nonchalantly circling over Stockholm. I, at least, was looking for revenge.

Through intelligence sources we knew that the tail cannon of the Tu-4, controlled by radar from the cockpit, had a number of weaknesses. If you attacked in pairs in tight formation, the Soviet radar operator saw only one nightfighter. If the leading J 30 then made a sharp turn at a distance of around 3,000ft (900m), the tail cannon would follow this aircraft, and provide an opportunity for the second Mosquito to get close enough undetected for a firing pass.

We were armed with four 20mm cannon loaded with tracer, armour-piercing, high-explosive and incendiary ammunition. In case of a shoot-down, our main concern was how to get

out of the way of the wreckage of our victim.

When we had closed on the Tu-4, the J 30 formation leader began to turn to port. However, the Soviet pilot then suddenly turned eastwards, which forced me to break off — and calm down a bit. It was lucky for us because shooting down the intruding Tu-4 over central Stockholm could have caused serious civilian casualties on the ground. The bright lights of the capital were clearly visible beneath us. I followed the Tu-4 eastwards over the Stockholm archipelago before breaking off and heading for home.

The rules of engagement for a situation like this were, at the time, rather vaguely formulated. Had I pursued the four-engined bomber over the sea and shot it down, I would have become a hero in the eyes of many people. However, I would almost certainly have been fired from Flygvapnet. In any event, I did not file a report as far as I can remember.

Our beloved J 30 Mosquitoes were becoming difficult to maintain and in need of a replacement. This would arrive in 1953 in the shape of another wonderful de Havilland aeroplane, the D.H.112 Venom NF.51. But that, as they say, is a story for another day!



#### ACKNOWLEDGMENTS

The Editor would like to thank Mike Packham, Ian Thirsk, Trevor Friend and Gennady Sloutski for their invaluable help with the preparation of this section

COMING SOON IN TAH — The D.H. Venom in Flygvapnet service, with more from Bengt Lindwall

## J 30 (NF.19) FORMER RAF IDENTITIES

Compiled by **Mike Packham**. Swedish serial follows RAF serial where known

MM626	TA277
MM627	TA278
MM630	TA279
MM635 <b>30029</b>	TA281 <b>30003</b>
MM636	TA283 <b>30004</b>
MM638	TA284 <b>30008</b>
MM642 <b>30044</b>	TA285 <b>30005</b>
MM644	TA286 <b>30001</b>
MM651 <b>30036</b>	TA287
MM652	TA288 <b>30014</b>
MM656	TA289
MM670	TA290
MM675	TA291 <b>30032</b>
MM682	TA292
MM683	TA293
MM685	TA294 <b>30006</b>
TA152	TA304
TA193 <b>30025</b>	TA305
TA236	TA308
TA238	TA338 <b>30019</b>
TA239 <b>30026?</b>	TA347
TA240	TA349
TA242 <b>30018</b>	TA350
TA248	TA353 <b>30020?</b>
TA265 <b>30027</b>	TA355
TA266	TA357 <b>30011</b>
TA269	TA389
TA270	TA393
TA275 <b>30002</b>	TA401
TA276 <b>30012</b>	TA403



*The Soviet Union's Tupolev Tu-4 Bull was an unprecedented piece of "reverse-engineering", the result of a massive undertaking to clone Boeing's B-29 Superfortress after three examples of the latter had made forced landings in the Soviet Far East in 1944. Although the two types looked identical, their construction was completely different, the Soviets using the metric system rather than the imperial system the bomber had been designed in. This caused severe challenges with basics like aluminium sheet thicknesses. Russian determination was never in doubt, however, and more than 800 examples were built.*

GENNADY PETROV COLLECTION




CONVAIR

# A DAY OF TRIUMPH AND TRAGEDY

*In the early 1950s Convair's San Diego factory was a hive of cutting-edge activity, with two wildly ambitious naval projects — the VTOL XFY-1 Pogo and delta-winged XF2Y-1 Sea Dart fighter — both pushing at the very edges of the era's technology. **BRUCE HALES-DUTTON** describes how morning glory for one turned to afternoon horror for the other*

**T**HE WORLD'S FIRST vertical take-off fighter and the fastest-ever seaplane should, together, have produced a unique and memorable display. And November 4, 1954, was indeed a day to remember. But not for the right reasons. For while one element of a new concept in naval aviation that was being shown off that day amazed onlookers, another ended the day at the bottom of San Diego harbour. Worse still, one man was dead before it was done. John Knebel was at Brown Field, near San Diego, California, that day. The former test pilot recalls: "It was a big public relations day for Convair with the demonstration of these two experimental projects".

By the early 1950s Convair was one of the USA's leading aircraft manufacturers, the company's bewildering output ranging from intercontinental bombers through airliners and flying-boats to supersonic interceptors. It was also a pioneer of what was then a revolutionary wing planform. So it was hardly surprising that its XFY-1 — also known as the Pogo for reasons that will become obvious — and the XF2Y-1 Sea Dart should be of delta-wing configuration. Apart from that, however, they were very



*The only XFY-1 to fly, BuNo 138649, hangs on its impressive pair of 16ft (4.88m)-diameter three-bladed contra-rotating Curtiss propellers during a test flight with "Skeets" Coleman at the controls.*

*Taking off presented its own challenges, but reversing back on to a spot on the ground (and ultimately on to a pitching deck, had the type gone into service) required incredibly fine adjustments and a level of airmanship that would have substantially lengthened the training process.*

TERRY PANOPALIS COLLECTION

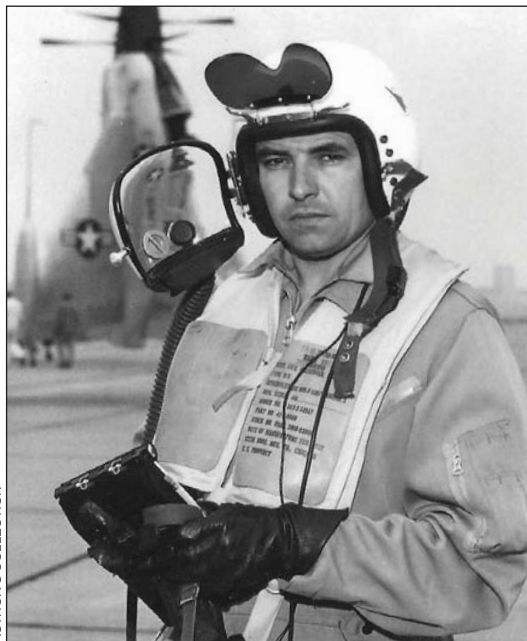


**“While one element of Convair’s new concept in naval aviation amazed onlookers, another ended at the bottom of San Diego harbour; worse still, one man was dead before the day was done . . .”**

*The second Sea Dart, YF2Y-1 BuNo 135762, in San Diego Bay. The garish yellow markings were applied to the first and second Sea Darts to enable Convair engineers to assess spray patterns during the type’s intensive test programme.*

TERRY PANOPALIS COLLECTION





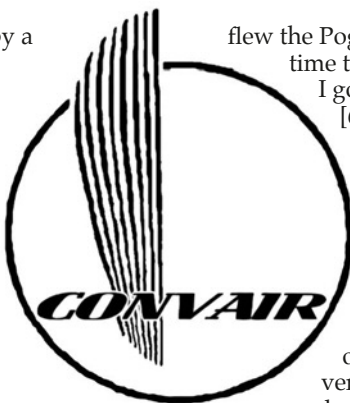
**ABOVE LEFT** Convair production test pilot John Knebel, who was one of the first pilots to qualify on the Lockheed P-80 and who set a new transcontinental speed record for flying-boats in the Convair R3Y Tradewind. **ABOVE RIGHT** "Skeets" Coleman demonstrates the XFY-1's somewhat awkward seating arrangements in September 1954.

different. The Pogo was powered by a complex Allison turboprop engine which drove contra-rotating propellers to pull it off the ground — vertically. The needle-nosed XF2Y used two Westinghouse J46 turbojets and operated from water, using what Convair called "hydro-skis."

The Pogo was intended to meet the US Navy's need for a fighter able to operate "from the fantail of a warship or the deck of a fleet oiler or merchant vessel". By April 1954 the first — and only — XFY-1 was ready to begin tethered testing in a special rig inside a 195ft (60m)-tall former airship hangar at Moffett Field.

On August 1 project test pilot James F. "Skeets" Coleman made the first free flight from the apron at Moffett. Over the next few months he made a series of vertical take-offs to ever-increasing heights followed by tail-first landings. By early November Coleman was ready for the next stage. On the 2nd he undertook a 28min flight in which 21min were spent flying horizontally.

John Knebel was flying chase that day in Douglas AD-5 BuNo 133927. He was later to discover — when he attempted to fly the Pogo without the benefit of tethered practice — how much difficulty Coleman was having with the tail-first landing. He explains: "The first time I



flew the Pogo I was having such a hell of a time that I kept having to add power.

I got up probably to 200–300ft [60–90m]. I didn't want to get that high. You had to get up out of ground effect, obviously, to control it at all because of the deflected slipstream. Once you started down you continued dropping it in.

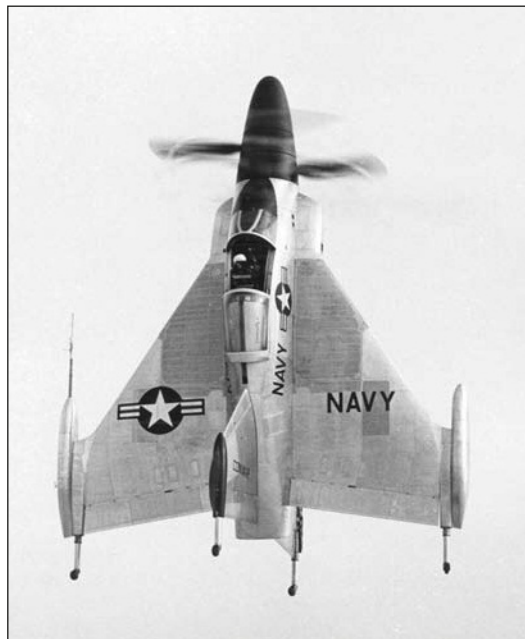
"I dropped it in so hard the second time I bent a pin that held one of the fins. I forget if it was the ventral or the dorsal fin. We had no real good rate-of-descent indicator

and if you got too high a rate of descent with only aerodynamic control, you would lose control. We had a system of warning lights which we played with in the rig. It was still very rudimentary and it was not adequate to keep you out of trouble."

## JET POWER AT SEA

The XF2Y Sea Dart, meanwhile, was Convair's response to a 1948 US Navy requirement for a supersonic water-based interceptor at a time when there were still doubts that high-performance jets could operate from carriers. In 1951 Convair was contracted to build two prototypes of a delta-winged fighter able to operate from the sea using "hydro-skis" which retracted into the fuselage. It was to have been powered by a pair of Westinghouse J46 engines





**ABOVE LEFT** With the XFV-1's massive 5,500 e.s.h.p. Allison XT40 engine (essentially a pair of T38s geared to drive a contraprop through a common gearbox) running up, Coleman prepares to lift off from the runway at Brown Field in September 1954. Moments later Coleman lifts the XFV-1 into vertical flight, as seen **ABOVE RIGHT**.



**ABOVE** Having made the transition from vertical flight, Coleman shows off the Pogo's pugnacious lines in horizontal flight. Despite the challenges of the aircraft's unorthodox take-off and landing regimes, Coleman described it as the most manoeuvrable aircraft he had flown; unsurprisingly, however, he found the cockpit uncomfortable.



**ABOVE** The sole XF2Y-1 prototype, BuNo 137634, during one of its many water trials. A total of five Sea Darts was built — one XF2Y-1 and four pre-production YF2Y-1s — although the last two of the latter remained engineless and never flew. The XF2Y-1 was initially fitted with a pair of Westinghouse J34s, but was later fitted with two J46s.



**ABOVE** Test pilot Chuck Richbourg (seen aft of the cockpit) makes preparations on the San Diego ramp for the ill-fated flight of the first YF2Y-1, BuNo 135762, on November 4, 1954. Note the small wing fences, added only to this machine, to cure a high-speed spanwise migration; and the wing of the R3Y Tradewind at the left of the image.

offering 6,100lb static thrust with afterburning, but the prototype (BuNo 137634) was fitted with two J34s producing little more than half that.

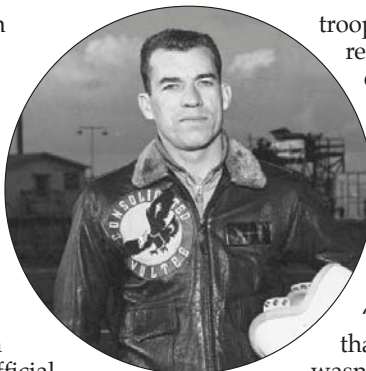
By late autumn 1952 the aircraft had been transferred from Convair's factory at Lindbergh Field to its San Diego harbour ramp. In December test pilot Ellis D. "Sam" Shannon began taxiing trials. On January 14 he made an inadvertent hop. The XF2Y-1's official maiden flight followed on April 9.

The aircraft turned out to be slower than it looked, thanks to the less powerful engines and high transonic drag. The second XF2Y-1 was cancelled but the first service-test YF2Y-1 (BuNo 135762), powered by J46s, joined the test programme in early 1954. Charles E. "Chuck" Richbourg (**INSET ABOVE**) made the initial test flights and on August 3 exceeded Mach 1.0 in a shallow dive.

By this time the US Navy was having doubts about both the Sea Dart and the Pogo. The vertical take-off and landing (VTOL) machine was clearly tricky to handle, while "ski-pounding" problems continued to plague the Sea Dart. In any case, it was now clear that conventional high-performance jet fighters could operate from carriers after all, rendering Convair's ingenuity unnecessary.

The company's response was to shift emphasis. A series of illustrations showed Pogos and Sea Darts providing cover for amphibious landings and for fleets of Convair R3Y Tradewind flying-boats supporting the operations.

A company film reinforced the change of mission. The commentary highlighted the Pogo's suitability for operations "close behind attack



troops." It added: "No landing strip required, no warm-up necessary, no extensive base facilities, and nearly immediate contact with the enemy".

A further response was the demonstration on November 4, 1954, to the navy brass and journalists. "We were anxious to make a good impression," says John Knebel. "The handwriting was on the wall that the navy had decided that it wasn't the direction they wanted to go in anymore".

That morning Coleman was telling an interviewer of his plans for the flight. He made it sound easy: "We expect to take off and immediately begin a transition to the horizontal. We hope to have accomplished that at 2,000ft [600m] at which time we will have a normal climb to about 4,000ft [1,200m]".

Asked about the landing procedure, Coleman said: "We expect to make a normal approach and then a conventional flare-out. At that point we are going to divert from the conventional procedure and take advantage of the lift characteristics of the delta wing. As we rotate to the vertical the propeller will take over the lift and we will make a normal touchdown".

### THE "JESUS CHRIST" MANŒUVRE

Billy Jack Long flew the AD-5 chase aircraft that day, while the Navy provided Piasecki HUP-1 helicopters to act as height markers for Coleman. Knebel's duties, however, kept him on the ground. "I was co-ordinating with the PR people and with [flight test engineer Bob] McGeary. We were in radio contact with Skeets, of course."

It was clear that the reporters at least were impressed with the Pogo. "Actually," Knebel

***Next stop oblivion — Richbourg taxis out for his demonstration flight in BuNo 135762 on November 4, 1954. The jetpipes of the afterburning J46-WE-2 engines were much longer than those of the J34s fitted in the XF2Y-1 prototype.***

TERRY PANOPALIS COLLECTION







**ABOVE** With Chuck Richbourg at the controls, Sea Dart BuNo 135762 pounds its way into the air from San Diego Harbour on November 4, 1954. Double “hydro-skis” were fitted to all five Sea Darts, although the XF2Y-1 prototype was also extensively tested with a single hydrofoil-type ski, which proved superior, if still not fully satisfactory.

recalls, “Skeets zoomed up a lot higher than he’d intended. The media people seemed pretty impressed with what they saw Skeets do”.

Afterwards the senior officers were driven in their staff cars the 15 miles (25km) back to San Diego for the rest of the demonstration while the other guests went in buses organised by Convair PR staff. Next on the programme was the giant R3Y Tradewind flying-boat, to be followed by Richbourg in the Sea Dart. But as he was making a high-speed pass over the harbour the aircraft broke up. Flaming debris splashed into the bay. Vivid images appeared in the following day’s *San Diego Union* newspaper as well as *Life* magazine. Knebel and other Convair personnel were still at Brown Field when the news came through. “We were monitoring the Lindbergh Field tower frequency,” Knebel recalls. “It was a big shock.” The Sea Dart had come apart as a result of pilot-induced oscillation, something that Richbourg had encountered during a rehearsal a few days earlier.

“Chuck was a brilliant engineer and a good pilot but he didn’t have as much flying experience in high-performance jets as he should have had to be in that aircraft”, Knebel recalls. “A few days before I’d used an F-86 to chase him in the Sea Dart. We made a practice fly-by and he got into what we call a ‘JC’ manoeuvre. That’s the term for a pilot-induced oscillation, or PIO. It

came to be known as a JC manoeuvre because the first time anybody encountered it up at Edwards [Air Force Base], all the pilot could say on his hot mike was ‘Jesus Christ!’”

### THE BEGINNING OF THE END

Recovery was comparatively straightforward at altitude but easier said than done in a high-speed pass at low level. Knebel says: “The people kidded Chuck and me that day because we got into a little PIO, although not as violent as the one he got into on the day he was killed. I was sitting on his wing in formation and I just bounced along with him and everybody kidded me: ‘Hey, Knebel you’re pretty good at flying in formation through JCs!’ I cautioned Chuck and he was aware of the PIO but when you’re putting on a demo . . . well, that kills more pilots than almost anything else”. He still has the coffee pot Richbourg gave him as a wedding present a month earlier.

Billy Jack Long took over Sea Dart test flying and John Knebel was designated back-up pilot on the Pogo. It hardly mattered. Official interest waned quickly after that day in November 1954 and although the company’s F-102 and F-106 interceptors went on to great success, Convair’s more offbeat deltas were retired to museums. It was indeed, as John Knebel recalls, “a day of triumph and tragedy”.





**TOP & ABOVE** During Richbourg's low-level pass at some 500kt (900km/h) the YF2Y-1 broke up under severe aerodynamic loads caused by the pitch-divergent oscillations which plagued numerous high-speed projects of the era. Richbourg initially survived the break-up, but was so badly injured that he died shortly afterwards. Sea Dart trials were suspended immediately and, although ski trials later continued, the type never flew at speed again.

# FIT FOR THE KING



Following operations in war and peace with BOAC, Consolidated Liberator G-AHYB was sold to a new owner in French Indo-China to serve as a VIP transport for Vietnamese royalty. **HOWARD CARTER** traces the long history of a very unusual “Air Force One”

**A**FTER WORLD WAR Two, many European nations still had colonies scattered across the globe. Usually, some form of despot was installed by the governing nation in order to control the area's natural wealth and run the colony. Born Prince Nguyen Phúc Vĩnh Thụy on October 22, 1913, Bao Dai (**ABOVE RIGHT**) became the 13th emperor of the Nguyen dynasty, the last of Vietnam, then part of French-controlled Indo-China.

From 1926 to 1945 Bao Dai was the King of Annam, a protectorate within French Indo-China that covered some two-thirds of present-day Vietnam. Following the fall of France in June 1940, the area was controlled by the Vichy French government until the Japanese invasion of Indo-

China that September. An accord between Vichy France and Japan was signed on September 22, 1940, which would see the Japanese directing policy through the French colonial administration, which in turn ruled the area through Bao Dai — his majesty apparently having little problem with switching sides.

In 1945, the French were ousted from Indo-China altogether by the Japanese and Bao Dai was encouraged to declare independence for the newly-minted Empire of Vietnam. Following the surrender of Japan to the Allies in August 1945, Bao Dai abdicated and handed power to Ho Chi Minh's Viet Minh the following month, taking the role of “supreme advisor”. After a year Bao Dai left Vietnam to live in Hong Kong and China, just

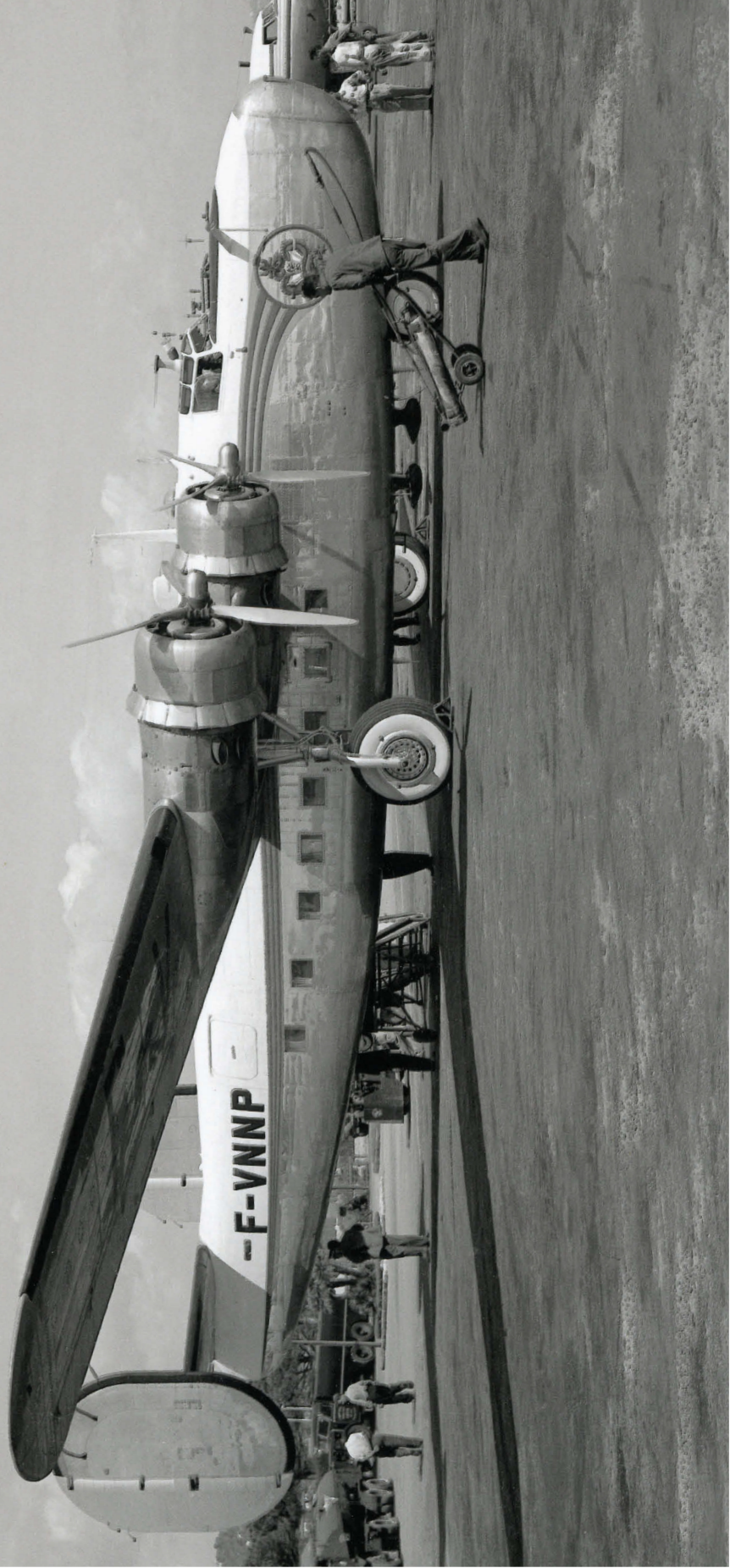


**ABOVE** Originally given the American military serial 40-2359 (c/n 11), Liberator AM920 was one of 20 bought for the RAF from the US Army Air Corps and delivered during April–August 1941. After a distinguished wartime career with BOAC as AM920, the inelegant but hardworking transport was given the civil registration G-AHYB in 1946.



The last word in Vietnamese luxury — this superb photograph of Consolidated Liberator F-VNPN, complete with whitewalled tyres, shows the much-travelled workhorse in its final colour scheme, while serving as a VIP transport for Bảo Đại, the Vietnamese head of state during 1949–55. Following its long career with BOAC as AM920 and G-AHYB, it was one of five sold to French company STA Alpes Provence in April 1951, initially being registered as F-BEFR. It was overhauled, appointed to a luxury configuration and put on the French colonial register as F-VNPN. Little is known about its ultimate fate.

VIA AUTHOR





PHILIP JARRETT COLLECTION

**ABOVE** *The first Liberators to arrive in the UK were six of the seven YB-24s built for US Army Air Corps service trials (serials 40-696 to 40-701), but which were delivered to the UK from March 1941 as LB-30As for transatlantic ferrying duties. This example is AM259, which was photographed with its civil registration, G-AGCD, in May 1941.*

as the French retook its former colony in November 1946. Three years later he was back, having been persuaded by the French to return as the nominal head of state.

He spent much time in Europe and received criticism in Indo-China for his close French ties and for living the life of a playboy. Following the French defeat by the Viet Minh at Dien Bien Phu in 1954, Vietnam was partitioned into the communist North and pro-Western South, the latter retaining B  o Dai as a puppet leader, as a result of which he moved permanently to Paris and appointed Ngo Dinh Di  m as his prime minister. Ousted by the latter in a blatantly fraudulent election in 1955, B  o Dai lived a life of exiled luxury in France and Monaco until his death in Paris in 1977.

## A LUXURIOUS LIBERATOR

During his period as the French-controlled head of the Vietnamese state, B  o Dai largely did what his masters ordered, in return for which the French Government kept him in the elegant

lifestyle to which he aspired. The French decided to supply their South-east Asian pawn with an "Air Force One", the aircraft selected being both unusual and interesting.

When the US Army Air Corps ordered 36 Consolidated B-24As in August 1940, a decision was made to transfer 20 of these aircraft (serial numbers 40-2349 to 40-2368 inclusive) to the RAF as Liberator B Mk Is (serialled AM910 to AM929). However, it was soon determined that the type was not suited for operations over Europe as it lacked a number of essential combat features. Most of the aircraft were then converted by Scottish Aviation at Prestwick to Liberator GR Mk I general-reconnaissance standard (fitted with four forward-firing 20mm cannon and provision for rockets) and assigned to Coastal Command's No 120 Sqn at Nutts Corner, where they arrived in June 1941, and went on to give excellent service attacking enemy U-boats.

Three of the original group of 20 Liberators — AM915, AM918 and AM920 — were converted to C Mk I transports and put into the vital trans-

*Liberator II G-AHYF (formerly AL592) taxis out for another transatlantic flight for BOAC after receiving its civil registration in 1946, and is seen here in the corporation's restrained post-war polished bare-metal scheme.*



PHILIP JARRETT COLLECTION





**ABOVE** At the end of December 1945 AM920 was listed as being part of the BOAC fleet and based in Montreal. On August 19, 1946, the Liberator was given its new civil identity, G-AHYB, after which it continued to serve the route between Montreal and Prestwick until the spring of 1950, when it was offered for sale to a new owner in France.

atlantic role of flying ferry pilots back to the USA after they had delivered Lend-Lease aircraft. Liberator AM915 was operated by Ferry Command until it flew into a hill in Argyll in cloud in September 1941; AM918 was allocated to BOAC and given the civil registration G-AGDR, but was shot down by a Spitfire near the Eddystone Lighthouse on the Devon/ Cornwall border in February 1942. Liberator AM920 was one of several operated as part of the North Atlantic Return Ferry Service, having been allotted to BOAC in August 1942. These aircraft carried full camouflage for most of the war, but Theyre Lee-Elliott's distinctive "speedbird" insignia for BOAC was painted on the forward fuselage, along with a large Union flag, while the flight crews wore full BOAC uniforms in compliance with the Geneva Convention.

During January 1945 BOAC's surviving Liberators were returned to the RAF, but the demands of war had deprived the corporation of modern aircraft with which to re-enter the burgeoning international airline market. Desperate for long-range transports, BOAC worked out an arrangement whereby it could get a number of the Liberators back in order to undergo modification to a civilian standard, some 17 examples of the type being on strength with BOAC by the end of 1945. One of these was AM920, which was later given the civil registration G-AHYB. The Liberators were stripped of paint, completely overhauled and fitted with airline-standard seats, advanced avionics and other equipment. The aircraft were highly polished and wore the simple, austere BOAC markings of the immediate post-war period.

By 1947 the corporation was operating some 175 aircraft of 18 different types — a situation which made running a profitable airline extremely difficult. In addition the government was forcing BOAC to buy British at all costs, thus forcing the corporation to use a variety of obsolete types, including the Liberators. Ultimately, however, BOAC received government permission to buy a limited number of American-built airliners. The Liberators gave good service, and AM920 earned the distinction of making BOAC's 2,000th transatlantic crossing, on February 10, 1946. The Liberators were finally phased out of BOAC service in September 1949.

### A NEW LEASE OF LIFE

The Liberators were sold off and G-AHYB found a new owner — STA Alpes Provence of France. Once again, the aircraft was overhauled, given a VIP interior, registered F-VNNP, and presented as a gift to Bao Dai (INSET LEFT).

Highly polished and sporting whitewall tyres, the Liberator served its new master well, delivering the former King of Annam and his sizeable entourage to gambling and holiday spots across Europe.

Little appears to be known of the ultimate fate of F-VNNP — it appears in the 1952 French Colonies aircraft register as operating with "Service Imperial Aer." at Da Lat, in the central highlands of South Vietnam, but is no longer listed in the same register for 1958. If *TAH* readers can shed any light on this hardworking Liberator and its career in Vietnam, please write to the Editor — the author would very much like to fill in the gaps and complete the story.







# Echoes from Dawn Skies

## A Lost Manuscript Rediscovered

**T**HE NEWSPAGES of the November 23, 1956, issue of British aviation weekly *Flight* carried an item which began: "With the passing of Frederick Warren Merriam — who died at Christchurch, Hants, on November 12 at the age of 76 — an interesting and distinguished link with the earliest days of British aviation has been severed".

The item goes on to list Merriam's achievements: he was the first pilot in Britain to fly through cloud (we think nothing of it today — but somebody had to be first), which he did on a Bristol Boxkite in 1912; he was manager and chief instructor at the Bristol Flying School at Brooklands, teaching many pupils who went on to distinguished aviation careers themselves, and in 1914 he became chief instructor to the Royal Naval Air Service at Hendon and later Chingford, before becoming an operational pilot on long, tiring anti-submarine patrols during the First World War. Merriam would have become a household name had he won the coin toss at the Royal Aero Club which decided who should accompany Arthur Whitten-Brown on the first non-stop transatlantic flight — that honour went of course to John Alcock. He satisfied himself instead with founding Britain's first gliding school, near Shanklin on the Isle of Wight, in 1922.

In World War Two Merriam served with the Fleet Air Arm, his considerable experience of practical psychology proving invaluable on selection boards. In 1954 he published his memoirs, *First Through The Clouds*, about his early years in aviation. Tantalisingly, the *Flight* report concludes with the statement: "Just before his death [Merriam] had completed another book on early flying called *Echoes From Dawn Skies*". The book, comprising first-hand reminiscences lovingly collected from his fellow pioneers, was largely completed when Merriam died, but was never published and was assumed lost.

So there the trail went cold — until, one day in July 2013, *TAH* Managing Editor Mick Oakey's phone rang. "Hello, my name's Sylvia Macintosh and I found you on the internet", said a voice. "I've got an old book manuscript here that's been in my family for ages. I wonder if you might be interested in looking at it? It was written by my grandfather. His name was F. Warren Merriam."

As soon as Mick had picked himself up off the floor, he arranged to meet Sylvia — who, extraordinarily, it turned out, lives just a couple of villages away from *TAH*'s West Sussex office — and was instantly able to confirm that it was indeed the long-lost manuscript. The rest, as they say, is history . . .

In the first instalment of our exclusive serialisation of the previously unpublished manuscript of *Echoes from Dawn Skies* by **FREDERICK WARREN MERRIAM AFC**, we present Merriam's original 1956 preface to the book, in which he explains how it came into being; and we include the introduction to his chapter about fellow pioneer Colonel Alec Ogilvie, who supplied Merriam with the fascinating Eastchurch memoir which begins overleaf

“**T**HE PRINCIPAL AIM in writing this volume has been to present a more personal and intimate picture than has yet been produced by aviation history writers of the civil pioneers of British flying. I thought only a participant of these early struggles could aspire to this, entirely overlooking the fact that I was the last person, in the literary sense, to do so. Therefore, I crave indulgence in this respect. If I have failed to reach my aim, it is not for lack of trying.

Some two years ago I conceived an idea and set to work most energetically to hunt up all the survivors of those wonderful days, to ask them if they would each contribute a story of a personal nature, something that had never before been published. It was a tall order and admittedly my hopes were not too high of finding sufficient material of the sort to fill a book. A tireless search ensued for more than a year. Many obstacles and disappointments assailed me. Of some “old-timers” no trace could be found, others had passed on and one or two were too tired to trouble. However, after a little gentle persuasion these eventually made the effort, and I am happy now in expressing my grateful thanks to all for their co-operation.

#### ALEC OGILVIE

Colonel Alec Ogilvie CBE FRAeS gained his ticket — No 7 — on a Short-Wright biplane in 1910. Before I took up flying, in 1911, I had heard so much about him and his personal contact with those great Americans, the Wright brothers, who invited him and the late Griffith Brewer to America as their guests. Ogilvie brought back some valuable information which he sportingly conveyed to the Eastchurch aviation circle without any thought of personal reward. We owe him a great deal and I am proud to have known this wonderful man. It was such unassuming men as he who helped early aviation in a very big way.



**ABOVE** *The spirit of Brooklands — a dapper Frederick Warren Merriam at his home, named “Brooklands”, at Christchurch in Dorset in 1953 and OPPOSITE, flying “straights” over the banked racing circuit at Brooklands, Surrey, on a Bristol Boxkite in 1911.*

F.W. MERRIAM ARCHIVE x 2

His wish in giving me these notes was that they should be recorded for Eastchurch people. That is only natural considering most of his early work was done there. His papers on that great early experimental flying ground and its personalities are of great historical account, and I am most grateful to be able to pass on some part of his intriguing early experiences in the air.

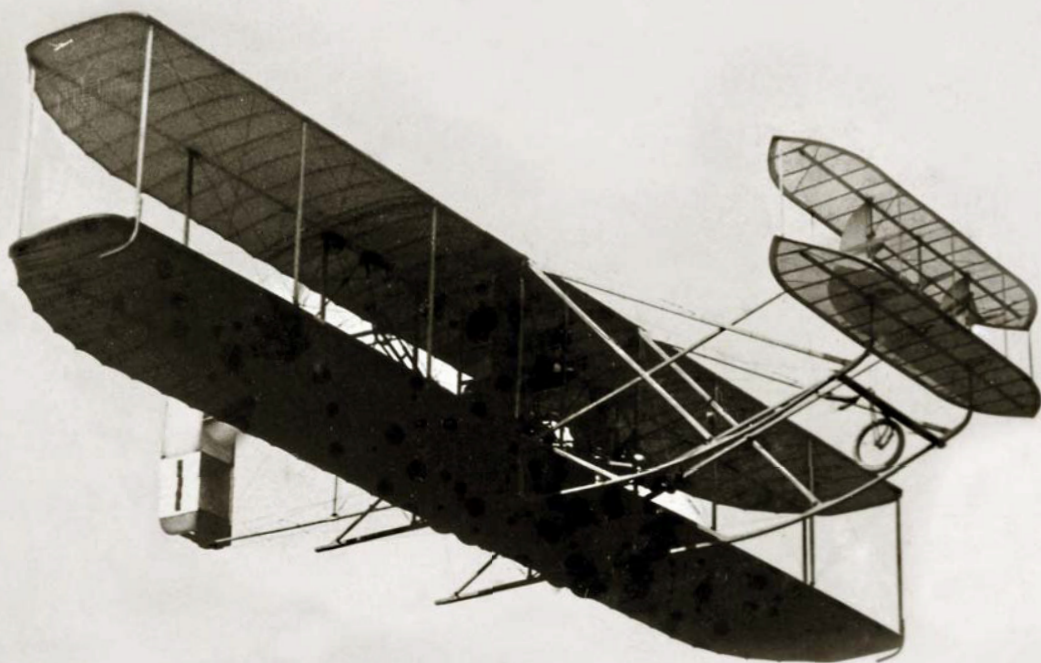
This most interesting and historic account from Ogilvie is an example of the stepping stones in British aviation. Ogilvie continued in his work for aviation under the late Air Marshal Sir Charles Lamb, a 1915 pupil of mine, at HQ Dunkirk, for a year and then went to the Air Ministry in charge of new designs. After the war he went to Paris as principal technical expert. Later he started Ogilvie Partners, which ran for five years and earned £20,000, but it did not put much into his pocket. Up to this time, of course, it would be impossible to find any pioneer who had made any money out of aviation. Indeed it was quite the reverse.

The mention of the Bristol Scout brings back memories to me, for it was in one of these, at Chingford in 1915, that I first looped the loop. Well, if his story isn't a thriller to the air-minded and others, then I do not know what is . . . ”



# EARLY DAYS at EASTCHURCH

Col Alec Ogilvie CBE FRAeS, 1882-1962



*Alec Ogilvie at the controls of Short-Wright biplane No 2 at the aviation meeting at Lanark in October 1910. Ogilvie demonstrated the aircraft's slow-flying capabilities by using minimal throttle, keeping the machine airborne at an average 24 m.p.h. (39km/h) during a circuit of the airfield. As he passed the finishing line he opened the throttle and, according to a report in Flight, "accelerated like a motor car until she had added 30 per cent to her speed".*

PHILIP JARRETT COLLECTION / ALEC OGILVIE IMAGE OPPOSITE TOP: ROYAL AERO CLUB TRUST







MY FIRST VISIT to the Isle of Sheppey was in July 1909.

I went to see Horace Short about the Wright Flyer which my partner, T.P. Searight, and I had ordered from the Wright brothers. The 'plane was No 2 of a batch of six which the Wrights had commissioned Short Bros to build. Charles Rolls was to have the first.

At that time at Shellbeach, where the Short brothers had erected their works, there were some five or six sheds with 80 men at work. Three Wright machines were in hand and the workmanship was very good. There was no sign of the 30 h.p. engines which were to come over from Léon Bollée's works in France. These were engines of Wright design but they were much inferior to the engines built by the Wrights in Dayton, both as regards materials and workmanship.

Horace Short was a man of impressive personality with an encyclopædic knowledge. He was a man who could exercise a great deal of charm, but he liked to have everything go the way he wanted and could be a bit rough if that did not happen. I think he did not much like the fact that Searight and I had set up an establishment at Camber [near Rye in East Sussex], and intended to work on our own and not under his eye. The difficulty we purchasers of Wright machines had then was that the Wrights could give no flying instructions owing to their other commitments in Europe. Wilbur had told us about this in May when he advised getting some experience in the air with a glider. Short was very much of the same opinion and showed us a glider which he had in hand for Rolls, a copy of which he could deliver in three weeks. There was a suitable hill for practice a few miles away, and Messrs Harbrow could put up a shed in a week. But as this was not in accordance with our plans, I could give no definite reply on the spot.

When I was at Shellbeach again, about a week later, Short was uncertain about delivery so Searight and I got T.W.K. Clarke to make us a glider on the lines of the Wright powered machine. We got permission to use a good gliding locality at Friston, behind Eastbourne, and got in some very useful gliding practice



during September and October. On October 23, 1909, we went back to Shellbeach, where, two days later, we met Orville. He expressed his satisfaction with the machines and collected from Searight and myself the balance of the purchase money, which was £1,000 in all. In the late afternoon, when it was calm, we saw a short flight by Rolls. He caught his rudder in the rail or starting carriage as he was getting off but took no harm.

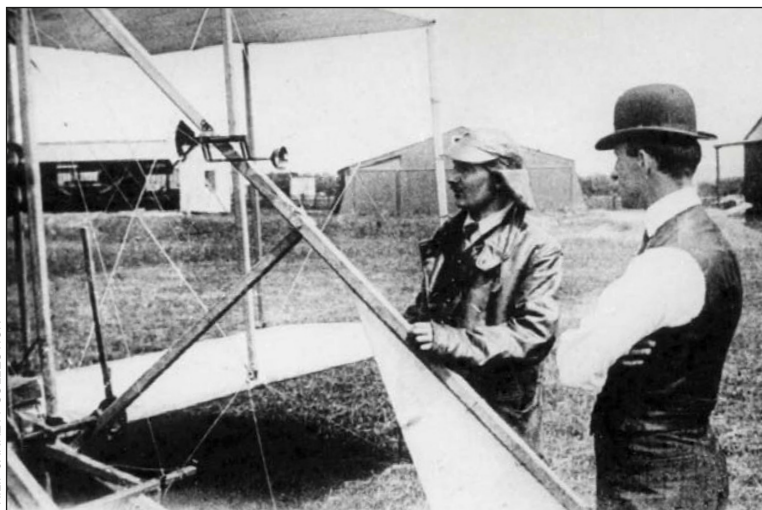
It took my friends and I until October 30 to complete our preparations to tow our aeroplane to Camber, but we could not start until after lunch as we were wanted as official observers for Moore-Brabazon's flight for the £1,000 *Daily Mail* Circular Mile. My diary says he came round us in good style but with considerable oscillation fore and aft. I remember we lay on the ground to make sure that there was always daylight between his skids and the grass.

#### A CONSIDERABLE SMASH-UP

During the next two months I had a number of short flights amounting to 1½hr in all, but there were innumerable engine breakdowns, some of a serious character. Then, on December 17, I had a considerable smash-up owing to a stall, and the damage was made much worse by my failing to shut off the engine so that the propellers continued to chew up the wings for an appreciable number of moments after the crash.

After a day or two dismantling and assessing the damage, we went to Shellbeach to see what Short could do about repairs. He promised to supply what was required in a fortnight but, in fact, the stuff was not ready until January 28 [1910], four weeks after the promised date. I went to see how things were getting along in the middle of January, and saw Rolls flying well, with right and left turns. After taking up an American, Mr Peterkin, Rolls gave me a flight using the pylon and complement of six weights, a special Wright starting apparatus. The engine was not pulling very well and the flight was a short one. We landed with a bit of a twist and broke the skid. On our smooth sands at Camber I had done many far worse cross-slides on landing and had taken no damage.





**LEFT** Alec Ogilvie (left) with Wilbur Wright at Eastchurch, probably during the latter's visit to Eastchurch to help Ogilvie with his repairs and preparations for the Gordon Bennett race on July 1, 1911. Note the early example of Ogilvie's spring-loaded airspeed indicator attached to the forward strut.

**BELOW** Ogilvie's Short-Wright No 2 is returned to the beach at Camber Sands during 1909-10. Contrary to what has been reported elsewhere, all six Short-Wright biplanes were fitted with engines built by Léon Bollée at Le Mans.

At the end of January 1910 I went over again to inspect the replacement items. The bill for these was £136 but as they amounted to nearly half an aeroplane the figure was not unreasonable. Short by this time was busy on a number of new aeroplanes of his own design, in which he wanted to interest me. We were, however, well enough satisfied with our Wright machine, although we would have been glad of a more reliable engine. Also as we wanted to go in for the British Michelin competition for the longest flight, before March 31, of an all-British machine, I wanted a statement from Short as to which items of the machine would have to be replaced.

By the middle of March I had a good idea of how to fly the machine and had done about 5hr. For the next fortnight we made strenuous efforts at Camber to fly with an NEC engine, a two-stroke British engine with four cylinders in line. But although G.F. Mort and his brother, who owned NEC, came down and gave us all the help they could, I never really got the machine off the ground and Moore-Brabazon won the competition with a 19-mile [30km] flight at Shellbeach on a Short machine.

The next time I was in Sheppey, the Royal Aero Club and the Shorts had moved over to Eastchurch, the aerodrome having been bought and turned over to the Club by Frank McClean (later Sir Frank McClean). Our object this time was to see Rolls and try to borrow a cylinder from him, which we did. After doing my Club Certificate flights on May 15, 1910, I was doing some speed running when the head blew off a cylinder. Rolls was then busy getting ready for his double crossing of the Channel, and it was very obliging of him to lend me one of his spare cylinders.

For September and October I was in America to talk to the Wrights and learn Orville's method of control. While there I also ordered a small racing aeroplane from the Wright factory in Dayton. This was without an engine as I intended to furnish it with an NEC engine similar to the one I had been using. It was a two-stroke with four cylinders but more powerful than our former NEC, and, with the cylinders in a V formation, very compact and sturdy. There was some trouble finding a sparking-plug which would stand up to the continuous explosions of a two-stroke, but once







*Ogilvie flying Short-Wright No 6 with an NEC engine at Camber Sands in October 1910. Contrary to Ogilvie's own statement, surviving records indicate that the machine was acquired by the Wright brothers from Charles Rolls's estate following his death, and was sold on to Ogilvie, who then modified it to Wright Model B configuration.*

PHILIP JARRETT COLLECTION

that problem was solved the engine was powerful enough and very reliable.

During the next few months, until we went over to Eastchurch for good, I put in a lot of flying without accident, except for one occasion when I landed downwind, ran into a soft patch of sand and solemnly turned on to my back. I had time to get out of the seat and land on my feet as the machine slowly overturned. My recollection is that the machine was very little damaged, but I got a good dressing-down by letter from Wilbur, who was then in Berlin, for landing downwind. At the time I was the only pilot in England flying a Wright.

#### THE MOVE TO EASTCHURCH

In the spring of 1911 Frank McClean went off with Dr W.S. Lockyer to the South Seas and turned over his two Short machines to the Royal Aero Club for the Club to offer to train some Royal Navy (RN) officers as pilots. I was asked by the Club to do the training, but I declined as my Wrights were controlled on quite another system to the Shorts. So the Club asked George Cockburn, who was far more suitable and who taught, with great success, Lt-Cdr Samson, Lt Longmore, Capt Gerrard and Lt Gregory, the first four RN officers to fly.

Early in May 1911 Searight and I began to see that the time had come to move over to Eastchurch. After doing a bit of cross-country flying over the Romney Marsh and prospecting a route to Sheppey, I flew over on May 22. From that day until the race for the 1911 Gordon Bennett [Trophy] we were all very busy erecting my small racer and fitting it with an NEC engine, radiators, etc. As well as V. Le Cren I had a carpenter, Horace Mallet, and a fitter, A. Graves, who had been with us from the beginning.

But my most valuable helper was Wilbur Wright himself, who came over from Berlin. His patent agent, Griffith Brewer, brought him down to Eastchurch.

[Gustav] Hamel (**INSET BELOW**) — a very fine pilot — and I had been selected to represent the Club in the Gordon Bennett. Hamel had one of the latest racing Blériots which was thought to be capable of holding its own against anything France or the USA could produce. It was known that my [racing] machine was not capable of a speed within 15 or 20 m.p.h. (25–32km/h) of the French-built machine, but it was reliable and, under some circumstances, might be able to put up a show. And it had a British engine. Anyway, there was nobody else available at that time.

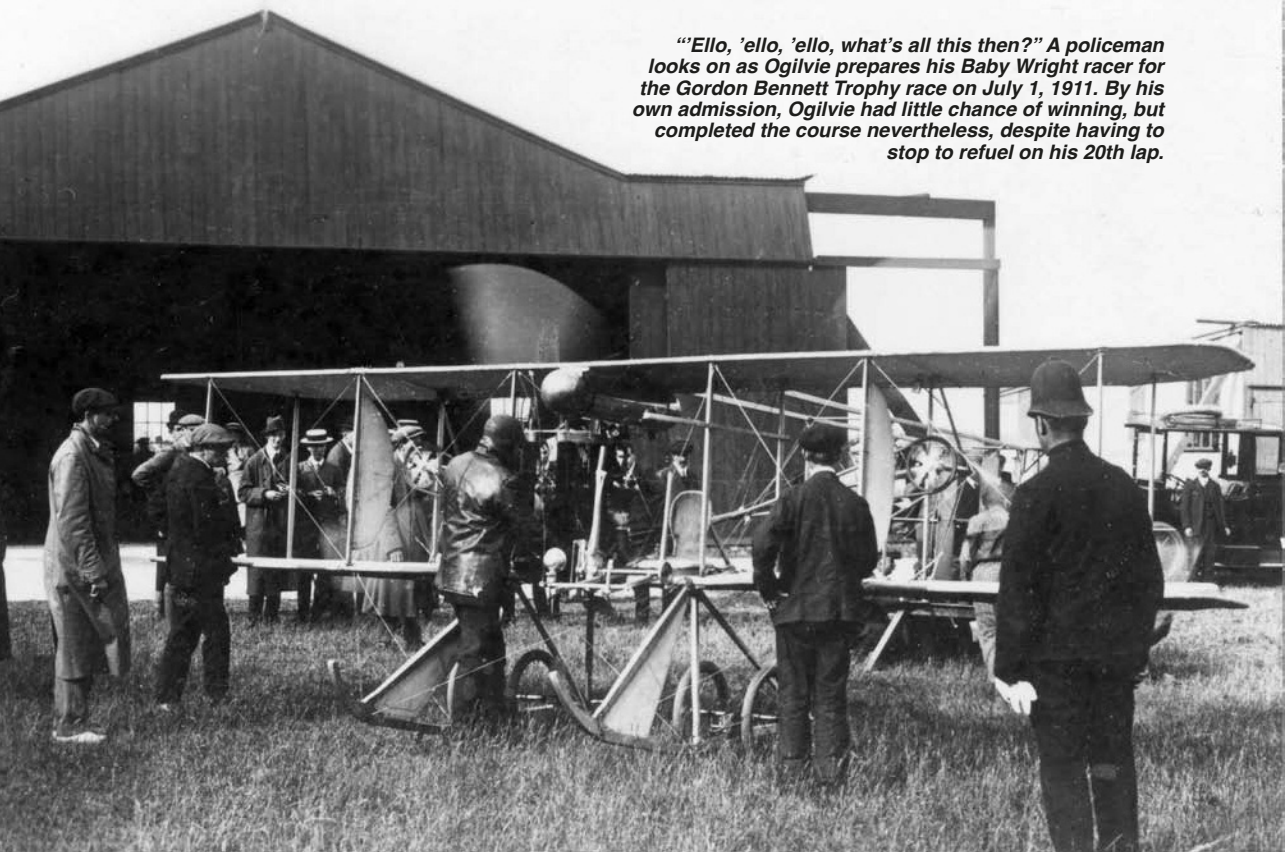
On June 15 I made my first flight with the racer, but after a few minutes the engine faded on me and I had to land. In turning sharply to avoid a soft patch of ground I touched a propeller blade on the ground. The propeller, of course, broke to pieces, and the other propeller spun me round so violently that the tail frame and the undercarriage were wrenched off. By now I had stopped the engine, and the aeroplane, at least the wing part of it, fell back on its trailing edges. All the spectators could see was a cloud of dust with my feet sticking out of it.

The accident looked rather a serious one from the repair standpoint and I remember Horace Short coming across to see if he could be of any help. However, with Wilbur and my own people everything was fixed up again in a few days. We discovered that the fading engine was caused by the magneto automatically retarding itself. Wilbur was a wonderful workman who knew exactly how to do any job in the simplest way. He postponed his return to Berlin for





*"'Ello, 'ello, 'ello, what's all this then?" A policeman looks on as Ogilvie prepares his Baby Wright racer for the Gordon Bennett Trophy race on July 1, 1911. By his own admission, Ogilvie had little chance of winning, but completed the course nevertheless, despite having to stop to refuel on his 20th lap.*



PHILIP JARRETT COLLECTION

ALEC OGILVIE IMAGE BELOW: ROYAL AERO CLUB TRUST

another week to make sure that everything was done properly.

In the race itself, [Charles] Weyman, flying for the USA, won on a Nieuport with a 100 h.p. Gnome, at about 80 m.p.h. [130km/h], about 2 m.p.h. faster than [Alfred] Leblanc of France, who was flying a Blériot fitted with a similar engine. As to Hamel, he lost control of his Blériot after rounding a pylon and touching a wing. He went over like a shot rabbit. He was flung out but rolled over and over and escaped with a severe bruising. He was a beautiful Blériot pilot and had acquired quite a lot of experience, but the Blériot team, in their efforts to beat the Nieuport, took the chance of cutting piece after piece off the wingtips to reduce the area and increase the speed. The crash occurred right in front of me and the cause was obvious.

For my own part it was clear I had not a hope except to complete the course. This I did, although I had to land to pick up a gallon or two of petrol. My best speed was about 55 m.p.h. [90km/h], which showed me that my engine was slightly more powerful than the Wright engine built in America.

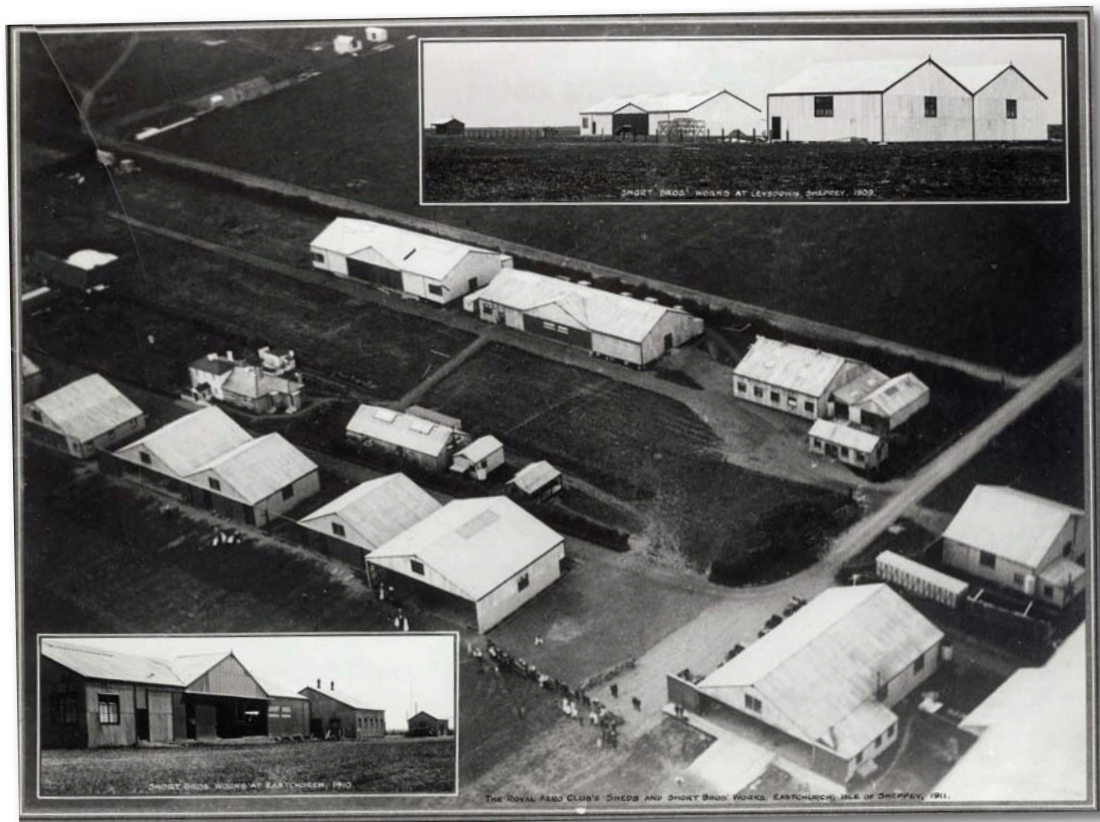
I now decided to give up all competition flying and stick to experimental work. In September



1911 I went to America again to help Orville in some soaring experiments at Kitty Hawk. On return to Eastchurch, in mid-November, I found McClean had had two more machines built by Short, each of them fitted with two 50 h.p. Gnome engines. One, called the "Triple Twin", had two chain-driven tractor propellers well out on the wings, and a central pusher propeller. The other, nicknamed the "Double Dirty", had both tractor and pusher in the central line. McClean took me for a flight in the latter and, although it was a good aeroplane, the pilot and passenger were involved in a hurricane of wind and castor-oil smoke. So the nickname was very well merited.

### THREE'S COMPANY

I now had all my three Wright machines going and had a lot of experimental work in hand. The little racer had a span of 20ft 6in [6.25m], but could be fitted with wings of 26ft 6in [8m] span. With these it could climb at 650ft [200m]/min which was very exceptional in those days. The No 6 Wright, which I had bought from Rolls's executors [see caption on page 43 — Ed], I converted into a single-seater with a small nacelle to increase comfort and decrease head resistance [drag]. I also cut the chord of the wings from 6ft 6in [2m]



to 5ft 6in [1.7m], and reduced the gap from 6ft [1.8m] to 4ft [1.2m].

With the co-operation of the National Physical Laboratory [NPL], Le Cren and I had got figures for the head resistance of a considerable range of strut shapes, and applying these we decreased the head resistance of the whole aeroplane. The alterations added about 25 per cent to the speed.

The [racer's] engine was an American-built Wright of the standard 35 h.p. type and was very reliable. The machine had a good rate of climb and as the engine was fitted with exhaust-valve-lifters it was pleasant to glide down with

the engine silently turning over and certain that it would start to fire as soon as required. In comparison with present-day aeroplanes and engines it might be of interest to know that I paid £300 for the racer and £200 for the engine. [Ogilvie is referring to the engine he fitted to the racer for the 1910 Gordon Bennett race in America — Ed].

The third machine, our original No 2 Wright, went through quite a big change. The NEC engine was placed in the middle, and in front of pilot and passenger, all enclosed in a body of a shape based on the strut tests. The engine was fitted with two silencers and could be started

**ABOVE** A composite of the aviation locations on the Isle of Sheppey in July 1912. The main image is an aerial shot of the Royal Aero Club (RAeC) and Short sheds at Eastchurch; the top inset is the Short works at Leysdown and the lower is a ground shot of those at Eastchurch.

**LEFT** One of the most influential and yet least-known of British aviation pioneers, Frank McClean acquired the land at Eastchurch in November 1909 and gave use of it to the RAeC for a fixed annual rent of a shilling. Seen here is his modified Short S.27, known as the "Tandem Twin" or "Double Dirty".



PHILIP JARRETT COLLECTION x 2





PHILIP JARRETT COLLECTION

**ABOVE** McClean's Short S.40 at Westgate-on-Sea, after it had been fitted with floats in May 1912. It was in this aircraft that McClean took Ogilvie for a flight before the former's sensational flight up the Thames on August 10, 1912, during which he flew between the footbridge and the road span of Tower Bridge and alighted at Westminster. **BELOW** Ogilvie in tropical headgear during his flight along the Nile with McClean during January–March 1914.

ROYAL AERO CLUB TRUST

easily with a handle from in front. The propellers and chain gearing remained as before. The body was warm and comfortable and there was quite a demand for passenger rides. On one occasion I took up Searight and two other passengers and had no trouble in getting off.

All through 1912 there was increasing activity in every direction on the naval side, and a lot of discussion about seaplanes between the naval pilots, McClean and Horace Short. In June McClean got Short to fit floats to a standard Short biplane and did some trials down at Harty Ferry [on the Isle of Sheppey]. I flew over with Guy Fowler and landed nearby to watch the trials and McClean took me up for a flight. The machine behaved in a very satisfactory manner and was, a month or two later, flown up the Thames and landed on the river opposite Westminster.

#### FROM EASTCHURCH TO EGYPT

In 1912 my assistant, Le Cren, had to return to New Zealand, but I found another, Harris Booth, a very intelligent young man who had been working at the NPL. With his assistance and his knowledge of measuring apparatus I was able to go ahead and get out the first spring-controlled airspeed indicator. I had had this in mind, as a safety measure, for many years. It was patented and was made in considerable numbers in my sheds at Eastchurch and later by the British Wright Company, in London, but it took a lot of developing and a lot of hard work before it was fit for general service. The first instrument,

excluding those tested on my own machine, was fitted to McClean's big hydro-aeroplane which was shipped out to Alexandria in November 1913. This hydroplane was a pusher fitted with a Gnome 140 h.p. engine, and with wings that could be folded back. The nacelle carried four — two in front and two behind — and the engine could be started with a handle from the back seat.

The original idea was for McClean, Cdr Samson and a mechanic to fly up the Nile from Alexandria to Khartoum, and then to carry on and shoot a few elephants from the air. But Samson found he could not go owing to the increasing pressure on the Royal Naval Air Service, and McClean asked me to go instead. Although I was pretty busy with the airspeed indicator work I had Booth to leave in charge and so I decided to accept such a fine offer.

McClean tested the machine at Eastchurch with wheels and then, in the latter part of November, sent it down to Harty Ferry for floats to be fitted. He made one or two test flights carrying three passengers and was then satisfied enough to have the machine crated and despatched by ship to Alexandria.

With his sister Anna, Hugh Spottiswoode and his mechanic Gus Smith, McClean went on ahead as the advanced party, leaving Horace Short, my mechanic Graves and I to bring up the rear just before Christmas. I much enjoyed this journey with Short as he was a most interesting companion and keenly alive to everything to be







**LEFT** Aerial explorers of the Nile — from left to right: Frank McClean, mechanic Gus Smith and Alec Ogilvie with the Short S.80 Nile Seaplane at Merowe in Sudan, about 210 miles (330km) north of Khartoum, on February 25, 1914. Ogilvie had flown in the 67ft (20.4m)-span S.80 back in the UK after its first flight on October 2, 1913.

**BELOW** Ogilvie in the cockpit of the Nile Seaplane during the Nile expedition. Starting off from Alexandria on January 3, 1914, McClean flew the S.80 via Rosetta to Cairo, where he was joined by Ogilvie, who accompanied him up the Nile to Khartoum, where the S.80 arrived on March 23. During the journey there had been 13 engine breakdowns and three “bad landings”.

seen. The above trip took three months with McClean from Alexandria to Khartoum.

In April 1914 I got back to Eastchurch and soon afterwards Booth received an appointment at the Admiralty Air Department. His place with me was taken by F.E. Cowlin. The remainder of that year and up to February 1915 was spent in developing, testing and making my airspeed indicators to a point where I felt I could safely turn over the whole business to my friend Griffith Brewer of the British Wright Co. Sales had been in his hands from the beginning.

#### EASTCHURCH AT WAR

At the end of 1914 all our sheds — club and private — had been taken over by the Navy and Eastchurch aerodrome became a Royal Naval Air Station. I received an appointment as Squadron Commander and was put in charge of the flying school where, during the next 12 months, I was under the command of Wg Cdr J.L. Forbes.

About 100 or more pilots were trained to the required standard of those days. We had, I believe, three casualties. One of my flying instructors was Jack, later Sir John, Alcock.

Two matters of interest I recollect during that year. The first was the Zeppelin [LZ-40/L.10] raid of August 9, when the captain of the airship dropped some bombs on the aerodrome thinking he was over London. I was not supposed to be concerned with the operational side of the station and so I was very startled to be called at my house and informed there was a raid on, and as the Wing Commander had gone up to the Air Department, I was the senior officer and would I please come down at once? I did so in a considerable state of alarm as I had no notion of what I ought to do.

On arrival I found all the officers and men had gathered on the aerodrome in front of the sheds, complete with a small pom-pom, which was the only artillery available. Soon, away over towards





F.W. MERRIAM ARCHIVE

**ABOVE** On November 3, 1915, Bristol's sleek but delicate single-seat Scout C earned the distinction of being the first landplane with a wheeled undercarriage to take off from an aircraft carrier, when Flight Sub-Lieutenant H.F. Towler departed the short flying-deck of HMS Vindex in Scout C serial 1255, with the help of one of Ogilvie's ideas.

the Swale [the deep-water channel that divides mainland Kent from the Isle of Sheppey] the airship was spotted, and without any order — from me at any rate — our pom-pom began to fire. As the shells were unable to reach even halfway to the Zeppelin this was soon stopped.

A day or two afterwards a letter arrived from the Cotton Powder Co's gunpowder factory at Faversham, stating that our shells had landed in the factory area and would we please not do it again. When this got about the Mess, it was not received with the seriousness it deserved.

The other recollection is of being asked in September to train some young fellows for flying off HMS Vindex, on which a small platform had been built over the foredeck. The aeroplane available was a Bristol Scout, a small single seater fitted with an 80 h.p. Gnome. We marked out the platform on the tarmac and it was appallingly small. Even with the ship steaming into wind it was obvious that the aeroplane would be over the side before it had acquired flying speed.

Thinking about this I remembered seeing, at the Wolverhampton Flying Meeting in 1910, a Farman, flown by, I think, Grahame-White, make a very good start for the getting-off competition. The tail of the machine was helped up by four or five mechanics who ran with it for a few yards until the machine had enough speed to keep its tail up without help. If we could do the same with the Bristol Scout the pilot would have a much better chance.

Guy Fowler, later an Engineer Lieutenant in the Royal Navy, was in this with me and we fixed up a slotted steel tube on trestles and a steel ball projecting from a short arm clamped to the tailskid of the Bristol. This slotted tube was at a height to put the aeroplane into a flying attitude when the steel ball was in the slot, and of as much length as we could get between the wheel axle and the tailskid. With this gear the head resistance of the aeroplane was much reduced and it could not swerve for the first few vital yards.

The pilots under training for this were C.F. Freeman, M.G. Day and Elliott, and they soon mastered the job. The first flight from the Vindex under way was made by Towler in November 1915. In the next year Freeman made an attack on a Zeppelin over the North Sea and would have brought it down if he had had a gun instead of some bombs which did not work. In Walter Raleigh's official history, *The War In The Air*, this tail-guide trestle is described as having being invented in the *Campania*. This is not correct. It was an Eastchurch idea.



#### ACKNOWLEDGMENTS

The Aviation Historian would like to thank Sylvia Macintosh, Andrew Dawrant, Philip Jarrett and Gordon Bruce for their help with this feature

**COMING SOON IN TAH** — more from F.W. Merriam's previously unpublished manuscript of memoirs by Britain's early aviation pioneers

# OGILVIE'S 1916 NAVAL AIR PROPHECY

AMONG OGILVIE'S PAPERS kept by the Royal Aero Club Trust at Royal Air Force Museum Hendon is a handwritten draft of a letter sent by Alec Ogilvie (seen at **RIGHT** in 1919) to his uncle, Sir George William Agnew, who served as the Liberal Member of Parliament for Salford West from 1906 to 1918. The draft letter is undated, but was probably posted on February 14, 1916, from Alec Ogilvie's address at Eastchurch, Isle of Sheppey



*Dear Uncle George,*

I have never written to you before on any public matter, but I feel I ought to do so now, to enable you to urge in the new session [of Parliament] the need for far greater efforts and for a far larger expenditure on the Air Service. Being in the Service myself, I hope you will be discreet with my name.

The situation is this: the Navy is no longer able to absolutely protect the country [sic], as it has done for centuries and, to a flying machine, the sea around Great Britain no longer constitutes a barrier. At the present rate of progress, it will be possible in a few years to land an army corps by air, in an unexpected place in the course of a few hours, or to destroy a city by means of an aerial bombardment. Aeroplanes already in existence can go 120 m.p.h. or carry a load of a ton of explosives. This may be an unpleasant situation to have to face, but the answer, which is equally plain, is that we have got to get the upper hand completely; our men have got to be better than anyone else, our machines have got to [be] better than anyone else's and we have to gain and keep the supremacy of the air as we have got, and kept, the supremacy of the sea. That is a fairly tall order but not impossible unless too much time is lost.

One essential is that the necessity of this policy should be recognised by the Government and by the country in general, just as the necessity of our sea supremacy policy has been recognised. I am convinced that the authorities do not look at the situation like that. They want to keep up with the times and all that, but not to lay out the immense expenditure in training, invention and experiment as is necessary to gain and securely hold supremacy. A hundred millions would be a small price to pay.

One basic advantage we have got is the character of the personnel which is possible to us [sic]. I remember Wilbur Wright, in the first real talk I had with him seven years ago, saying that he considered that Englishmen ought to make the best flyers because of their keenness for riding and all kinds of sport. From my own experience as an instructor in flying, I am convinced that this is perfectly true and that, given good training and good machines, our fellows can hold their own. That, however, is not enough. Our sea supremacy is held because we are a maritime nation; because the training of officers and men is longer and better; and because our ships are, each in their own class, a year or so ahead of anyone else's. We set a standard, others copy it, but by the time they have reached our old standard, we have gone another step ahead and set up a new one. This is what ought to be happening in aeronautics but is not so: if anything, it is the other way and with our present methods, is likely to remain the other way. The mistake of our present system is that it is controlled by the wrong men. It is impossible for elderly men who have been through the mill of their own service, in which they are absolutely wrapped up and of which their knowledge is profound, to deal vigorously and sympathetically with a new service, of which their technical knowledge is small and insufficient to cope with the new problems arising every day — almost every hour. It is ridiculous, in my opinion, to talk of the air service branch as being parallel to the destroyer branch or the submarine branch. The seaplanes and the coastal patrols may be a subsidiary branch of the Navy but the Air Service, which is to give us supremacy, is far bigger than that.

The leadership wanted is that of a man, not too old, of a very receptive mind, of sound judgment but of great enthusiasm and sympathy with airmen. The powers you should give him should be almost absolute in his own line, so that he can override all the red tape and jealousy which is now clogging progress. As regards machines, it is now clearly necessary to specialise and to turn out machines specially adapted to their own particular work. In order to keep ahead in each class, it will be necessary to refit all the effective scouting, fighting and bombing squadrons with new types of machines every three months or so, so fast do types become obsolete, and to ruthlessly scrap [sic] all inferior machines, except those wanted for training purposes.

Such a policy means a proper system of competitive designs and experiments every three months to determine the best machine of its class; then an immense organisation to build the selected machine in large quantities in a given time and to issue them to the squadrons. There is no finality; as soon as the new type is decided upon and put out to the builders, the experimental branches of the firms must get to work on another and more efficient design for the next competition and so on. Similarly with engines, guns, bombs and other details. Such methods would mean a very large expenditure but would ensure rapid progress.

As regards training, continual expansion of established schools should be going on and new schools starting up in every suitable locality. It is not possible to centralise flying training except to a very limited amount, because of the danger of collisions in the air. A hundred or so pupils is about the maximum in one locality, if half of them are in the air at any one time. Then there should be specialised training schools where advance instruction in scouting, fighting and bombing is given, each at its own separate school. Night flying is a separate branch again. For this work we have no suitable machine as yet.

I hope I have written enough to convince you that we have hardly attacked the fringe of what has to be done and for the powers that be to think of retrenchment and cutting off of supplies is madness.

*Yours, Alec*





# REIMAR'S LITTLE RAY OF SUNSHINE

Since the early 1930s German brothers Walter and Reimar Horten had been working on an ambitious series of flying-wing designs, a number of which were still being developed as the Second World War ended.

**RICARDO M. LEZON** examines Reimar Horten's subsequent career in Argentina, where he continued to design futuristic flying-wing gliders



**F**OLLOWING THE END of the Second World War, during which the Horten brothers, Walter and Reimar, had continued to develop their pre-war experiments with flying-wing designs, the latter departed to Argentina, where he would resume his research. His collaboration with the *Instituto Aerotécnico* (IAe), part of the *Fábrica Militar de Aviones* (FMA), gave birth to the IAe.34 and IAe.41 tailless gliders, IAe.37 and IAe.48 delta-wing jet fighters and the IAe.38 "Naranjero" cargo aircraft.

## South American getaway

By the end of 1947 Reimar had been assigned to a group within the IAe led by legendary German designer Kurt Tank, the main effort of which

was focused on the development of Argentina's indigenous IAe.33 Pulqui II jet fighter. The personal relationship between Horten and Tank, however, was strained, and worsened with Horten's increasingly harsh criticism of the aerodynamic characteristics of the Pulqui II. This tense situation deteriorated to a point whereby the pair could not work together, with Horten offering the Director of the IAe, *Brigadier Mayor* Juan Ignacio San Martín, an alternative plan for an aircraft which would eventually replace the Pulqui II. As a result, Tank relegated Horten to the background, leaving him virtually no work.

Horten asked San Martín for permission to develop some of his flying-wing projects, which was granted, providing that such work would not interfere with the development of the IAe.33.

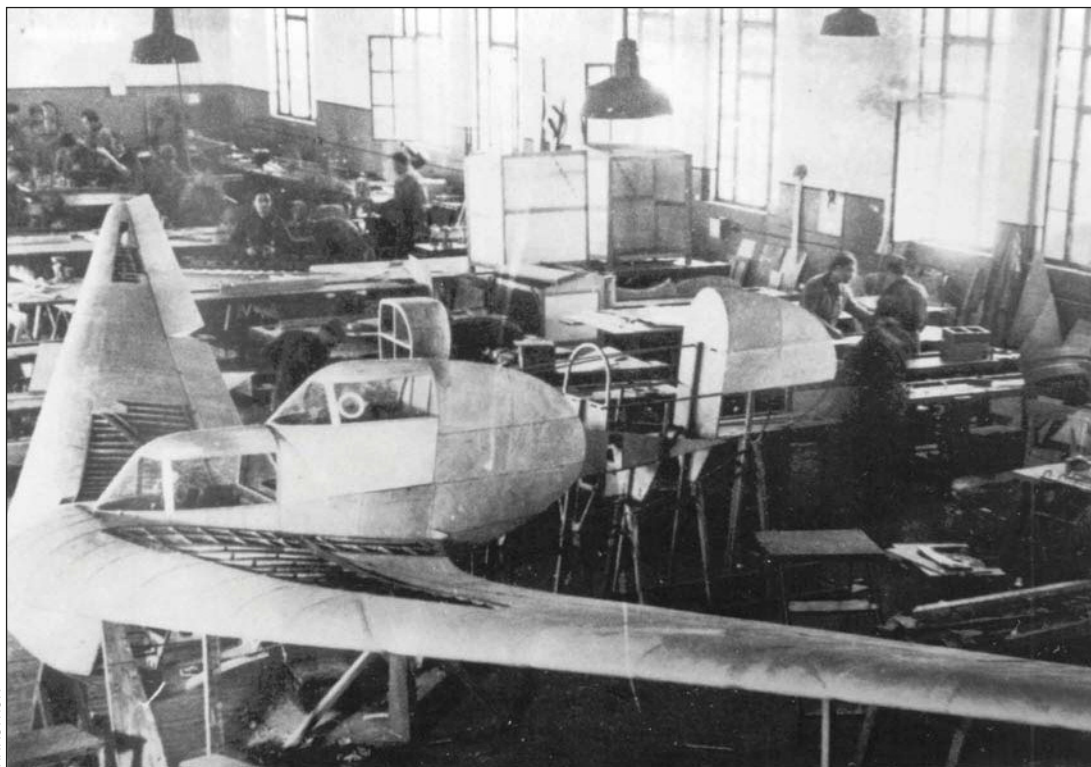
**OPPOSITE PAGE** *Reimar Horten as an Oberleutnant in 1945. Both Reimar and his brother Walter had been fascinated with aviation since childhood and by the time they were teenagers had started experimenting with tailless model aircraft, an early foretaste of the unorthodox approach that would later become a hallmark of their aviation career. Their first full-size glider, the Ho 1 flying-wing, was built at their parents' house in Bonn, and made tentative flights in 1934. Both brothers joined the Luftwaffe in 1939.*



*One of the two single-seat I Ae.34m "Sun Ray" flying-wing gliders built by Reimar Horten's group of designers and engineers in Argentina in the 1950s. Although Horten had been experimenting with tailless designs for decades, the flying-wing concept was still problematic and the Sun Rays proved difficult to fly well.*

MIKE HOOKS COLLECTION





**ABOVE** One of the two-seat IAE.34 Clen Antú under construction at Córdoba. The high-aspect-ratio wing was swept approximately  $23^\circ$  at quarter-chord with  $3.5^\circ$  dihedral. Yaw control was by means of the rudder pedals, which activated spoilers, located close to the wingtips, which could be used either differentially or together.

Horten's first national project in Argentina was a two-seat flying-wing glider for gliding schools. It was identified by its designer as the H.XVa, but received the official designation IAE.34 Clen Antú (Sun Ray in the local Araucanian language). The first phase of the project was completed by April 1948, at which point Horten accepted Tank's suggestion of building an aerodynamic test glider for the Pulqui II, at the same time as beginning construction on four IAE.34 prototypes.

The Clen Antú programme progressed slowly, the first example not being completed until early 1949, as Horten was finishing work on the Pulqui II gliders. He wanted to start testing the first Clen Antú prototype immediately, but it was not available as it had been loaned to the IAE's public relations department for display at an exhibition

of the nation's aviation industry in Córdoba, along with the first Pulqui II glider.

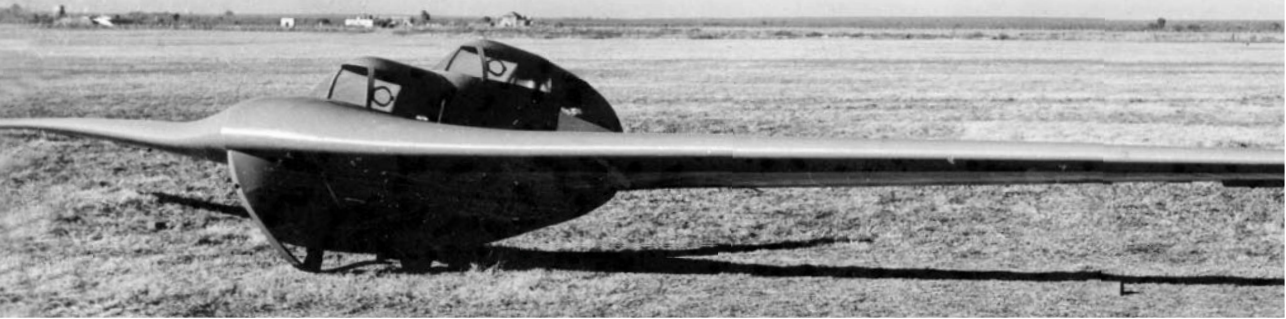
The Clen Antú prototype became available in March 1949, but, as it had been exposed to the elements for more than a month and its structure was built entirely of wood glued with casein glue, thorough repairs were necessary before tests could be undertaken.

### First flight

The first of four prototypes (c/n 1) made its first flight on June 20, 1949, with IAE test pilot *Capitán* Edmundo O. Weiss at the controls. According to Horten and Weiss, the glider performed well. As a result, in the spring of 1949, Brigadier Mayor Cesar R. Ojeda of the the *Ministro de Aviación* (MdA) invited a group of experienced pilots from

**The startlingly futuristic two-seat IAE.34 at Córdoba. The undercarriage consisted of a sprung front skid with rubber blocks which curved under the fuselage pod, where a pair of tandem wheels with mechanical brakes was fitted.**

MIKE HOOKS COLLECTION





**ABOVE** A *Clen Antú* in flight following the type's maiden flight on June 20, 1949. It was not easy to fly. Pilot Manuel Fentanes recalls a flight in which he had difficulty in lowering the nose to see the tug. "I was careless and had taken the glider too high. Trying to track the tug aircraft I was using the pedals, and almost made the tug stall".

the *Club Argentino de Planeadores Albatros* to Córdoba to assess the unusual new glider. The results were less than satisfactory; it quickly became apparent that the pilots needed intensive training to fly it. Former *Clen Antú* pilot Manuel Fentanes recalls: "The flights were undertaken from the IAe airfield [at Córdoba], usually towed by a Focke-Wulf Fw 44. Although the glider was a two-seater, the conversion flights were made by one pilot.

"Flying the glider was not easy, as conversion training was needed. The pilot's position was very straight and with a seat parachute. The rudder pedals were independent but they could also be operated simultaneously. They did not move a conventional rudder but rather operated airbrakes located close to the wingtips, making

level flight difficult. Downward visibility was almost nil, unless the aircraft was banked. Following the tug aircraft was not easy."

Taking these negative opinions in hand, Horten began a long programme of improvements to the IAe.34 design. The three prototypes received various aerodynamic devices designed to improve flight characteristics at low speeds.

By 1951 the Pulqui II had already begun to demonstrate its shortcomings and the MdA began to reconsider Horten's proposed delta-wing jet fighter alternative. Indeed, the MdA's interest was such that it decided to end its relationship with Tank's group and authorised Horten to contract the employees necessary to undertake his projects. Horten invited his brother Walter, who declined the offer, as well as designer Karl L.E. Nickel and test pilot Heinz Scheidhauer, who arrived later that year. Both had Horten history, the former having taken part in many of the brothers' developments in Germany and the latter having undertaken the test flights of almost all German gliders during the 1930s. This trio, with an important group of local assistants, formed the Horten Group.

Despite this upturn in Horten's fortunes, the efforts of the new group were not enough to make the IAe.34 a good aircraft. Although it was designed specifically as a two-seat training glider,







**LEFT** To improve the aircraft's low-speed handling characteristics, the first IAe.34 prototype was modified with an additional lifting surface mounted just aft of and below the trailing edge, as seen here, following which it was redesignated as the IAe.34B.

**INSET BELOW** In 1946 the IAe Director, Brigadier Mayor Juan San Martín, visited Europe, where he persuaded a number of former Axis aircraft designers, including Caproni's Cesare Pallavicino, Emile Dewoitine, Kurt Tank and Reimar Horten, to re-establish the Argentinian aircraft industry.

its flight characteristics in certain conditions were extremely marginal. It was particularly unstable at low speeds, making landings somewhat challenging. Manuel Fentanes explains:

"On November 25, 1951, we left Merlo with Enrique Höerhammer in IAe.34 LV-X12 [c/n 2] and flew for more than an hour. On returning to the airfield we were short on approach owing to a strong headwind; we just about made it over the telephone wires, but stalled and hit the ground. The Clen Antú was totally destroyed but we escaped unharmed."

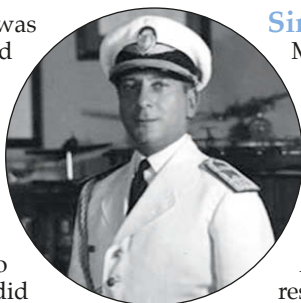
He continues: "The Clen Antú was unstable. It required between 50 and 100 hours of training to be able to say the pilot really controlled it."

Although these issues stopped production of the troublesome glider, it did not prevent the three remaining examples being kept in service by the *Federación Argentina de Vuelo à Vela* (FAVaV) and assigned to several clubs, where most pilots did their best to avoid them. Nevertheless, once in flight, the flying-wings displayed some interesting flying characteristics and it is worth remembering that the type set a new national distance record for gliders of 320km (200 miles) on November 11, 1953, with Heinz Scheidhauer and Hector Bravo at the controls.

The flying-wing gliders were undoubtedly a disappointment, but Horten continued to enjoy the IAe's unconditional support. However, Horten was not happy with the Institute and in his book, *Nurflügel* (Reimar Horten and Peter F. Selinger, H. Weishaupt Verlag, 1983), he describes his view of the situation:

"Working conditions in Argentina were more difficult than in Germany during the war. We could get neither pine spruce nor birch plywood, so we had to use inferior materials. The biggest problem was the glue. Brigadier Mayor San Martín ordered that the glue was to be prepared

by the chemistry department. When we received it, it was hardening and most of it was already useless. Several aircraft were lost owing to faulty glue. The introduction of new prototypes was also most peculiar. Before a prototype could fly, the Institute's public relations department would send it to a distant village, where it was displayed in a park until grass began to grow under its wings. After which the prototype was ready for scrapping. Nine gliders were manufactured under these conditions."



### Single-seat Sun Ray

Meanwhile, during March 21–25, 1951, the first Argentinian Gliding Congress took place at Villa Rumi-pal, in Córdoba Province. It was to be a significant meeting in the history of Argentina's gliding community as it gave rise to the establishment of the FAVaV and the *Instituto Argentino de Vuelo à Vela*, resulting in substantial government support for sports gliding.

Among the congress guests was Reimar Horten, who took the opportunity to extol the virtues of the IAe.34 and its potential development. As a result MdA minister Cesar Ojeda proposed building a pair of gliders in a single-seat variant as Argentina's entrants in the following year's World Gliding Championships in Spain. Although time was short, Horten accepted the challenge. Design work on the new version began immediately under the designation H.XVb, later redesignated as the IAe.34m (m for *monoplaza* — single-seat).

The two single-seat prototypes were built in a very short time and registered LV-XXB (c/n 1) and LV-XXA (c/n 2). The former flew for the first time on October 19, 1951, the second following it into the air on February 9, 1952. They were similar in all respects to the two-seaters, except with regard to the undercarriage, which was changed to a single-wheel arrangement with a rearward-



## FMA IAE.34 & IAE.34m CLEN ANTÚ DATA

### Dimensions

Span	18.0m	(59ft 6in)
Length	4.40m	(14ft 5in)
Height	1.60m	(5ft 3in)
Wing area	19m <sup>2</sup>	(204.5ft <sup>2</sup> )

### Weights

Empty		
IAE.34	275kg	(606lb)
IAE.34m	245kg	(540lb)
Loaded		
IAE.34	475kg	(1,047lb)
IAE.34m	345kg	(760lb)

### Performance

Max speed	200km/h	(124 m.p.h.)
Landing speed	60km/h	(37 m.p.h.)

retracting nosewheel, the rear wheel being accommodated in a ventral retractable fairing. To speed up construction time, the first example was built using the tail of the fourth IAE.34 prototype (c/n 4), and thus initially retained the serial number 4. It was ultimately re-serialised as No 1, identifying it as the first of the single-seaters.

Pilots Eduardo Bazet and José Ortner were selected to fly the IAE.34s during the championships in Spain, which started on July 3, 1952, at Cuatro Vientos aerodrome, near Madrid. In addition to the flying-wings, the Argentinian team also fielded two Slingby Type 34 Skys, which were to be flown by José Cuadrado, Manuel García and Francisco Rossi. Unfortunately Bazet and Ortner had very little time to adjust to their new machines and their unusual flight characteristics, and this was reflected in the poor results they achieved.

While the IAE.34s aroused a great deal of curiosity and expectation at the tournament, their performance was disappointing. On July 3, Ortner suffered an accident after a training flight, while the second example, manned by Bazet, was damaged while landing during the fourth official test. Their undercarriages were not suitable for the rough Spanish ground. Despite the IAE.34's poor performance, José Cuadrado finished fourth in the single-seater category flying a Slingby Sky.

Following the championships, one of the IAE.34s was selected to be modified as a powered glider, the idea being to fit a 20–30 h.p. engine driving a folding pusher propeller, but the project was stillborn owing to economic reasons.

Undeterred, during 1953 Horten proposed yet another flying-wing project, in which one of the gliders was to be converted into a powered glider equipped with a small Turboméca jet engine. The IAE authorities denied Horten permission to acquire the powerplant on grounds of its high cost, but the idea continued to gather momentum via an unexpected path. Some members of the IAE decided to collaborate with Horten on an unofficial basis and began designing an engine based on a supercharger turbine extracted from a radial engine. Although this jet-powered version of the Clen Antú was never built, and it is unclear if the powerplant was ever even completed, the project gives an idea of the lack of cost-control that permeated the IAE at the time, a period brought to an end by the Perónist regime in 1954.

In 1962 the Aero Club Junin, 160 miles (260km) west of Buenos Aires, held a national gliding competition in preparation for the following year's IXth International Gliding Competition, also to be held at Junin. The second IAE.34m was taken to the 1962 competition wearing a revised colour scheme of red, white and pale blue. After

**TOP** The IAE.34 No 1 beside the Instituto Argentino de Vuelo á Vela hangar. **BELOW** The first single-seat IAE.34m, LV-XXB, at the World Gliding Championships in Spain in June 1952. All Clen Antús were originally painted in the Argentinian national colours of pale blue and white, with the Sol de Mayo emblem on the rear of the pod.

VIA AUTHOR







**ABOVE** One of the two IAe.34m single-seaters in flight. Reimar Horten himself referred to the two-seat variant as the H.XVa and the single-seaters as H.XVbs. Horten also developed the H.XVc (IAe.41), a side-by-side two-seat flying-wing glider, named Urubú (Owl), which first flew in 1953 and made a towed crossing of the Andes in 1956.



**ABOVE** Still showing remnants of the red, white and pale blue scheme in which it was painted in 1962, the second IAe.34m was placed in storage until 2000.



**ABOVE** The second IAe.34m during its painstaking restoration for static display at the Museo de la Industria Brigadier Mayor Juan San Martín in Córdoba.

the competition the IAe.34m was flown back to Córdoba with the help of a Morane-Saulnier Criquet tug aircraft, which suffered engine failure near Merceditas in Santa Fé Province. Both aircraft landed safely. The next day the IAe.34m was dismantled and taken by road to Córdoba.

### The sole survivor

Only one IAe.34m, c/n 2, still exists and is currently on display at the Museo de la Industria Brigadier Mayor Juan Ignacio San Martín, in the city of Córdoba. The sole survivor owes its existence to the dedication of a small group of highly skilled aviation enthusiasts.

Early in 2000, a group of members of the museum realised the historic value of the Clen Antú stored at the Club de Planeadores Córdoba in Marcos Juárez, Córdoba. On May 20 of that year, the members, led by Juan José San Martín, Juan Ignacio San Martín and Juan José Martínez, dismantled the glider, placed it on a low-loader and transported it to the museum, where it was planned to restore the aircraft to static condition as a representation of the FMA's "golden years".

With no known Clen Antú extant, however, lack of information and parts became pressing problems. Indeed, the project proved to be much more complex than initially anticipated, and work continued over the next five years. The general condition of the aircraft was poor, as it had been stored for more than 30 years. Aware of the aircraft's value and historical importance, the restoration team decided to follow the restoration criteria applied to the museum's other restored



**ABOVE** The simple cockpit of the restored second IAE.34m, with the six basic flying instruments on the panel. Note the rather primitive control system incorporating rods connected directly to the control column, and the airbrake-operating pedals.

**RIGHT** The restoration of the IAE.34m took five years of concerted effort from the dedicated team of volunteers at the Industrial Museum at Córdoba. It was completed in the original pale blue and white colours of the original Cien Antús in late 2006 and is still on public display at the museum.



aircraft, which meant not altering the production methods or materials used to construct it in the 1950s. Several surviving technical drawings of the IAE.34 and IAE.34m were obtained from the FMA archives, which provided impetus to the restoration project. However, a substantial amount of information vital to the project still had to be found.

With little documentation, the restoration team had to dismantle the glider down to its smallest components in a “reverse-engineering” process. Usable components were removed, then refurbished or replicated. None of the original wood was usable for anything except the creation of patterns to make new components.

The restoration project started in November 2001, largely thanks to the contribution of Roberto Tacchi, who provided a stock of wood used in the production of Schleicher ASK-18 AR gliders.

Finished in the distinctive blue-and-white colour scheme it originally wore in the 1950s, the restored glider was officially presented to the Museum on December 19, 2006.



#### ACKNOWLEDGMENTS

The author thanks Biblioteca Nacional de Aeronáutica, Federación Argentina de Vuelo á Vela, Museo de la Industria, Francisco Halbritter, Manuel Fentanes, Juan Ignacio San Martín, José Martínez and Raul Alberto Peris for their invaluable help

### FMA IAE.34 & IAE.34m CLEN ANTÚ (SUN RAY) PRODUCTION LIST

Type	c/n	Registration	Remarks
IAe.34	1	—	First flight June 20, 1949
IAe.34	2	LV-X12	Written off at Merlo, October 19, 1951
IAe.34	3	—	—
IAe.34m	4 (1)*	LV-X14 LV-XXB	First flight October 19, 1951 as LV-X14 To World Gliding Championships, Spain, June 1952. Damaged on landing July 3, 1952. Repaired
IAe.34m	2	LV-X25 LV-XXA	First flight February 9, 1952 as LV-X13 To World Gliding Championships, Spain, June 1952. Damaged on landing. Repaired. To Dirección Nacional de Fabricación e Investigación Aeronáutica (National Directorate of Aeronautical Manufacturing and Research — DINFIA) October 3, 1962. To Club de Planeadores Córdoba. To Museo de la Industria, Córdoba, May 20, 2000. Restored and put on display December 19, 2006

\* New c/n in brackets



Duncan Menzies in Egypt in 1931.



# “A Very Audible Remark...”

One of the leading British test pilots of the inter-war period, **DUNCAN MENZIES** served with the Aeroplane & Armament Experimental Establishment during 1933–35, before going on to become a test pilot for Fairey. Menzies’ biographer **MATTHEW WILLIS** uncovers a report written by the test pilot in 1961, in which he remembers an infuriating forced landing made in a Vickers Vildebeest III in 1935

**I**N THE EARLY 1930s crew comfort had little or no priority in the minds of those who wrote official aircraft specifications. Some aircraft had a lever with “Cockpit Heating ON–OFF” marked beside it, but my memory of the Vickers Vildebeest is that it had no such lever at all.

Of all the aircraft at the Aeroplane & Armament Experimental Establishment’s (A&AEE) base at Martlesham Heath in those days, the Vildebeest led the field in unpopularity when it came to finding a pilot willing to undertake a ceiling climb and full-throttle level flight in the winter months.

Despite the pilot being placed so close to the Bristol Pegasus engine it was the coldest and draughtiest of the lot. At the finish of the test, height had to be lost in steps of 2,000ft (610m) with a pause of some minutes while the pilot thawed out, tears streaming from the eyes and with agonising pains in all joints. There was no way of avoiding the pain, dress how one would.

An entry from my flying logbook for January 7, 1935, reads as follows:

**Date/Time** January 7, 0845hr  
**Aeroplane Type & No** Vildebeest K4164  
**Pilot** Self  
**Passenger** LAC Beale  
**Time** 1hr 15min  
**Remarks** Ceiling climb and levels. Forced landing in field at Trimley St Martin

It was at the finish of the above flight that I found myself coming in from the North Sea over Felixstowe at 600ft on course for Martlesham. A wide-spread snowstorm was coming down from the north and we were in the beginnings of it, with visibility in the region of 2,000yd (1,830m). The snowflakes were increasing in size but I had finished my flight and there was the usual coffee and warmth to look forward to in the "C" Flight office only seven miles (11km) away. All seemed well.

I knew the size and shape of the storm from studying it from above and I knew that if it got too thick for my liking I could turn out of it to the west and stand off for half an hour, by which time it would have cleared Martlesham. The aircraft was at full torpedo load with only 1¼hr of fuel used up, so I had plenty of time in hand.

We were down to 400ft with 600yd (550m) visibility deteriorating rapidly when I gave up any idea of coffee. The engine began to run rough and lose power; an instinctive forward movement of the throttle made things worse but a reduction in the setting put things right. The hot-air intake to the carburettor was engaged and had been since the beginning of the let-down.

Successive reductions in throttle setting in order to keep the engine running meant that we were not going to make Martlesham, nor clear the storm, nor even stay in the air much longer. Trees, hedges and the occasional cottage were too close below our feet and I decided that the next hedge which came into view marked the downwind boundary of our landing field. With a loud bellow over my shoulder to Beale, the throttle and switches were cut and we fell into a field the size of which was unknown.

The Vildebeest had a tall handbrake lever on the starboard side of the cockpit, operating a hydraulic master cylinder which gave differential braking by rudder-bar movement. When the far hedge loomed up, full port rudder produced a broadside slide and we ended up with the starboard mainplane three-quarters of the way across the Trimley St Martin—Martlesham road without a scratch on the aircraft [as seen **BELOW**].

A passing motorist gave me a lift to the Station HQ building, where I reported to Chief Engineer "Mac" McKenna on the position of his aircraft and possibly expressed one or two opinions.

### Surveying the damage

I must digress at this point to say that the previous month I had made a forced landing at Fersfield in Norfolk when collecting the first production Blackburn Shark from Brough.

Mac said he would come and look at the Vildebeest and we set off in his car. There was no conversation to begin with and then he said: "Look







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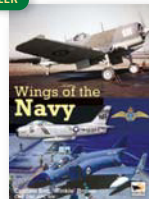
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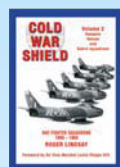
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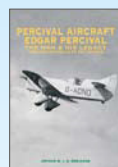
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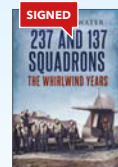
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**LEFT** *The author as a young Hunting-Clan hostess after joining the independent airline on May 20, 1957. Angela is the author of several books, including a novel, *The Snows of Yorkshire*, and a memoir of her experiences as an air hostess, *Before There Were Trolley Dollies*. For more information visit her website at [www.angelawaller.co.uk](http://www.angelawaller.co.uk).*

AUTHOR'S COLLECTION

In May 1957 **ANGELA WALLER** joined British independent airline Hunting-Clan as an air hostess, quickly becoming a veteran of the company's now-legendary Safari Services, in which flying down to deepest Africa in draughty and noisy Vickers Vikings and Avro Yorks, and later sleek pressurised turboprops, called for the resourcefulness to deal with anything — from lonely monkeys to movie stars

**I**N THE LATE 1950s, when I was an air hostess with Hunting-Clan, we operated our "Safari Service" to various cities in Africa. We flew in daylight only and each night the passengers and crew stayed in a hotel, then continued the following day on the next leg of the flight. The aircraft we used initially were 34-seat Vickers Vikings. The crew consisted of Captain, First Officer, Radio Officer, Flight Engineer and just one girl — the Air Hostess. Sometimes an Avro York was used instead of the Viking, in which case the cabin would be divided in half, with passengers in the forward section and cargo in the rear section.

Often, to fetch additional supplies, I had to walk through the cargo area. One day when going back there, I heard the chirping of small birds. Among the cargo on that flight were cages containing



# A FLYING



BRIAN ROBBINS

*Vickers Viscount 732 G-ANRT, seen here at Salisbury, Rhodesia (now Harare, Zimbabwe), in 1958, was one of three ordered by Hunting-Clan in 1953. The company was the first British independent airline to place an order for turboprop aircraft, although all three were leased to Middle East Airlines in 1955, and did not fly with Hunting-Clan until September 1957.*





*Hunting-Clan Avro York G-AMXM at Heathrow on September 18, 1957. Formerly MW323 in RAF service, this York was one of six acquired by the airline, two of which, G-AMVY and G-AMVZ, never entered service and were scrapped. The Yorks were used mainly for Hunting-Clan's "Africargo" services, but were often used on part-cargo, part-passenger services on the "Safari" routes. INSET BELOW The author in Hunting-Clan uniform in 1957.*

THE PETER KEATING COLLECTION © A FLYING HISTORY LTD

several hundred day-old chicks, and they could be heard loud and clear over the York's four mighty Rolls-Royce Merlin engines!

#### **A MATTER OF DEATH — AND LIFE**

Compared with some airlines, our training was short — but, of course, great emphasis was placed on safety and emergency procedures. The Vikings and Yorks were unpressurised, and, when checking the aircraft before passengers boarded, we ensured that there was a full oxygen bottle (which could run for about 15min) on board.

Passengers who had emphysema or other breathing problems often needed to be given oxygen but I cannot explain what happened on one flight. A passenger told me that the woman sitting next to her had said she didn't feel well. I looked at the ailing passenger; her head was back, her eyes closed, and she was very pale. I shook her arm and asked "Are you all right?" No response. I shook her arm harder and asked again if she was all right. Still no response. I felt her wrist but couldn't find any pulse; I checked her neck — but still couldn't detect a pulse. I went to the cockpit, asked the captain to put up the "No Smoking" sign, and asked passengers not to smoke "as I have to give oxygen". I put the mask over the woman's nose and mouth, and turned on the oxygen supply. The bellows, which should inflate and deflate as a patient breathes, hung limply. This woman clearly was not breathing. Not a word was said in training about what to do with a corpse on board.



After about ten minutes the captain came back and asked if everything was all right. I didn't want the other passengers to realise what had happened, so I whispered, "No it isn't. I can't find a pulse and she isn't breathing". The expression on his face clearly said "New girl . . . doesn't know what to do". He crouched beside the unconscious woman and felt for a pulse at her wrist. Then he felt her neck. As he did so, he noticed the bellows weren't moving. "She isn't breathing", he said. "That's what I just said", I answered, adding "We only have about two minutes of oxygen left".

I decided to stand beside the passenger, keeping the oxygen mask covering most of her face, until we landed. The captain was deep in thought, obviously thinking . . . nearest airport . . . radio ahead for a doctor . . . when suddenly the woman sat up and pushed aside the oxygen mask. My jaw dropped but somehow I managed to ask her "Do you feel all right?"

"Yes," she answered, "but I do feel very hungry. I thought you said something about serving lunch?" She ate lunch and seemed perfectly fine for the rest of the flight. What had happened? I've wondered for more than 50 years. Did she go into a trance-like state so that her breathing became very shallow and her pulse undetectable?

Our training also covered serving food and drink, and we spent a memorable afternoon learning how to make the most commonly requested cocktails. However, one new air hostess was taken aback when a passenger asked for "a pink gin". She had heard of it but



**ABOVE** A Safari Service baggage label with the distinctive double-elephant's-head logo. The first Safari service was flown in conjunction with Airwork Ltd from Bovingdon on June 14, 1952.

**LEFT** Hunting-Clan hostess Joyce Darbyshire, who joined the airline the same day as the author, serves refreshments aboard a Viscount. Safari services initially operated with only one hardworking hostess.

had no idea how to make one. Showing remarkably quick thinking she said "Oh . . . a pink gin is a matter of such personal preference — how do you like yours made?"

### INTO AFRICA

On Safari services to Nairobi in Kenya, we left London in the morning and flew to Malta, where we stayed the first night. The Vikings couldn't make the London—Malta leg without stopping to refuel at Nice. The next day we flew south over the North African desert to Wadi Halfa, a small town on the banks of the Nile in northern Sudan, where we spent the second night. The third day's flying took us south to Entebbe in Uganda, where some passengers disembarked before we continued on to Nairobi.

We then had a day off in Nairobi and I often spent some time in the game park close to the city. Whenever you passed another car in the

park, drivers would ask each other, "Have you seen any lions?"; or there might be a helpful "There are two lions under the trees, about half a mile along this track". One day we were lucky enough to find two lions, a male and a female, just about 10ft off the track. On our northbound three-day journey we stayed overnight again in Wadi Halfa, then Malta.

The overnight stays at Wadi Halfa or night landings in Khartoum (in Sudan) to refuel had the magic of an African night. Because there was virtually no light pollution, the night sky seemed darker than anywhere else and the stars seemed very big and very bright. Nowhere else in the world have I seen so many shooting-stars as in those parts of Africa.

Talking of African parts, former Hunting-Clan Captain Bill Cumbus recalls one scheduled stop which always engendered a very particular sense of anxiety: "Between Khartoum and

**The Vickers Viking made up a large part of the Hunting-Clan fleet, the airline acquiring a total of 13, although one was for spares use only. This example, G-AGRW, originally flew with BEA as Vagabond, and is seen here at Heathrow on November 12, 1954.**

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BRIAN ROBBINS

**ABOVE** In February 1955 a subsidiary, Hunting-Clan African Airways, was formed to operate freight and passenger flights from Salisbury to various points in Rhodesia and Nyasaland. Two Douglas Dakotas were used on the tourist flights between Salisbury, where this photo was taken, and Vilanculos (in Mozambique) and Johannesburg.

Entebbe we sometimes stopped to refuel at Juba in southern Sudan. The local tribesmen at Juba, the Dinka, were a fascination to the ladies. During early boyhood a weight was attached to a personal part of their lower body which, over time, greatly increased its size. They used to tend their cattle standing on one leg, with the third very visible; we male crew members got very little respect in comparison . . ."

The local wildlife was also a cause for concern in some of the more remote stops. Bill continues: "Refreshments at Juba were served under a thatched covering which, on one occasion, disappeared during the two-day interval between our southbound and northbound flights. It transpired that a nest of mamba snakes had slithered down the pole of the thatched covering shortly after our departure two days previously".

My own first Safari flight, on September 29, 1957, was London—Nairobi—Salisbury aboard York G-ANGF. After the usual first night-stop in Malta and the second in Wadi Halfa, we were flying south from Khartoum and I was in the cabin serving drinks. The captain appeared through the door from the galley (which was just behind the cockpit) and beckoned to me. As I went into the galley he and the



Radio Officer grabbed me and "washed my face" with a rather dirty dishcloth that had been lying in the sink. "Ceremony for 'crossing the line' [Equator] for the first time", announced the captain, then handed me a "certificate" that he'd written out, signing it "King Neptune".

Our Safari flights from London to Salisbury took four days, following the same route as the Nairobi-bound flights. The crew and passengers night-stopped in Malta and Wadi Halfa, but with an added night-stop in Entebbe, where we stayed at a hotel close to Lake Victoria — which is so vast that you cannot see any opposite shores. The first explorers must have thought they had reached the sea!

#### THE WESTERN ROUTE

Unusually for passenger flights from London to West Africa in those days, our Safari route to Accra in Ghana took us round

the western "bulge" of Africa, and we landed at a number of places on that coast. At that time most airlines flying from London or other European cities to Accra or Lagos in Nigeria took an overland route, refuelling at Timbuktu (which was in French Sudan until the independence of Mali in 1960).

Our route was different. After leaving London,

MAP BY MAGGIE NELSON

Key

-  Night stop
-  West African Turboprop Safari Service – London to Accra
-  West African Safari Service – London to Accra
-  Central African Safari Service – London to Salisbury
-  East African Safari Service – London to Nairobi
-  Connecting services



# Safari Service

HUNTING AIR TRANSPORT Ltd opened its low-cost African Safari Service with a Viking flight to Nairobi on Saturday June 14, 1952, and the following February was granted a seven-year licence to operate the East and Central African routes, both flying the same route to Entebbe, where the routes split to Nairobi and Salisbury. In October 1953 the Clan Line shipping group bought an interest in Hunting to form Hunting-Clan. In 1955 the Safari Service was expanded to include routes to West Africa, and the "Africargo" service was inaugurated with Avro Yorks in July the same year.

## —AFRICARGO





At Heathrow on August 7, 1958, Hunting-Clan took delivery of G-APNO, the first of a pair of Douglas DC-6As (the second, G-APNP, arrived on September 11). Like the Yorks they replaced, these were used mainly for cargo services, but could also be converted for passenger use. The DC-6s entered "Africargo" service on December 14, 1958.

STEPHEN GREENSTED COLLECTION

## DC-6 DOWN UNDER

JUST BEFORE CHRISTMAS 1959 I went on a Douglas DC-6 charter to Adelaide, South Australia, to bring home the film unit which had been making the Robert Mitchum and Deborah Kerr film *The Sundowners* there. Before we left Adelaide the production secretary explained that, as they'd just finished filming, they would have the traditional "wrap party" aboard the aircraft, and he asked to see how much alcohol we had on board. "Oh dear, this won't do", he said, "The wrap party is always . . . well . . . do you mind if I order more?" He placed the order and the booze was loaded. I would venture a guess that a DC-6 has never, ever, carried so much alcohol!

On the way home our flight was delayed several times but we arrived back at Heathrow late on Christmas Eve. That was my only visit to Australia, and a highlight for me is that on the first evening, spent in Perth, the crew (I was, as usual, the only female member) met in the hotel bar for drinks. When the captain asked for a gin and tonic for me, the barman refused to serve me. "Ladies can't drink in here", he said, "Ladies drink in the lounge". An argument ensued, the barman continuing to refuse to serve me, saying that the law didn't allow women to drink in public bars. Eventually, the captain stood up and said, "She's one of the crew. She drinks with us", and the barman served me a gin and tonic, thus ensuring my place in history as the "First Woman To Drink In A Public Bar In Australia!"

**AW**

we landed and refuelled at Biarritz in the south of France, then flew on to Tangier, Morocco, where we spent the first night. The next day we flew south, landing at Agadir in Morocco, Villa Cisneros (now Dakhla) in the western Sahara, and then Bathurst (now Banjul) in The Gambia, where some passengers disembarked. We would spend the second night there and on the third day fly on to Freetown in Sierra Leone, where again some passengers disembarked, before we continued on to Takoradi in western Ghana; and finally to Accra, where we had a day off before making the three-day journey back to London.

On our free day in Accra we always went to a beautiful beach — I tried to learn to surf but never succeeded in standing up on the board — and the hotel provided insulated containers of curry for our lunch. Northbound, when we stopped at Freetown, a sealed package about the size of a shoebox would be put on board "in care of the Captain". The box was said to contain uncut diamonds, from the country's diamond mines, but we could never check the contents because (for obvious reasons) it had to be handed over in London with the seals intact.

Bill Cumbus recalls one occasion when he was given responsibility over and above the call of duty: "A package of uncut diamonds had been put aboard at Freetown, the paperwork giving its weight — which we checked — and describing the contents as 'mineral products'. On this occasion we had to divert to Lisbon for an



**ABOVE** Fully adjustable, the seats of Hunting-Clan's coach service Viscount afforded unsurpassed views from the type's much-celebrated generously-proportioned oval windows. Note the company's crest above the seats.

**LEFT** The author (at left) awaits the next group of passengers with a colleague. When the Viscounts entered Hunting-Clan service in 1957 a second air hostess was added to the crew — although, being a veteran of the single-hostess Viking and York Safari Services, Angela was regarded as a senior air hostess.

overnight stay. Portuguese customs brushed aside the package, as they were only interested in illegal cigarettes. The Portuguese airline staff would not accept responsibility for the package as its stated value was higher than their insurance coverage — so I took it with me and slept that night with it in my bed!"

#### **FROM VIKING TO VISCOUNT**

The first Christmas after I started flying — 1957 — I went to Accra on our West Africa Safari. We arrived there on December 18, spending the next day at a beautiful beach where again I tried to

learn to surf. While our aircraft was being checked and refuelled, an engine fault was discovered. A new part was flown out from London but the aircraft bringing it was delayed on the way. We should have departed on the 20th but we waited — and waited — desperate to be home for Christmas. While we waited, the hotel music system played over and over a recording of Bing Crosby singing *I'll Be Home For Christmas*, making us all the more homesick. As it turned out, we eventually left Accra on the 22nd and breathed a sigh of relief as we arrived at Heathrow on Christmas Eve.

*One of the two Hunting-Clan DC-6As at Salisbury in 1959. Although the Yorks had provided sterling service on the Safari and Africargo routes, the pressurised DC-6 was a far more modern proposition and represented a major step forward for the airline.* BRIAN ROBBINS







**LEFT** The “stew’s view” — passengers await a demonstration flight from Eastleigh Airport, Nairobi, aboard Viscount G-ANRR in 1957. The first of Hunting-Clan’s Viscounts, this aircraft crashed at Frimley in Surrey during a test flight on December 2, 1958, killing all five crew members aboard.

**OPPOSITE** With sunlight glinting off its polished-metal upper surfaces, Viscount 833 G-APTB shows off its new Hunting-Clan colours in the summer of 1959. Three 833s, fitted with higher-powered Dart engines for hot and high conditions, were introduced on Safari services from July 1959.

The following Christmas I was scheduled to work on a charter flight to Paris on Christmas Day. I arrived at Heathrow to find that early fog had closed the airport, and we could not take off. Just before noon, there was a short break in the weather and we took off for Paris. Unfortunately the fog came straight back and Heathrow closed again. We waited in Paris, hoping for another break in the weather so that we could get home — at least in time for supper! While we waited, we had lunch. I chose duck. It was tough — very tough. When the waiter cleared the plates he asked if I had not enjoyed the duck? “Well,” I said, “it was very tough . . .” He gave that well-known Gallic shrug and said, “Bien sûr, mademoiselle; durck ees always turf”.

When larger, faster aircraft — Douglas DC-6s,

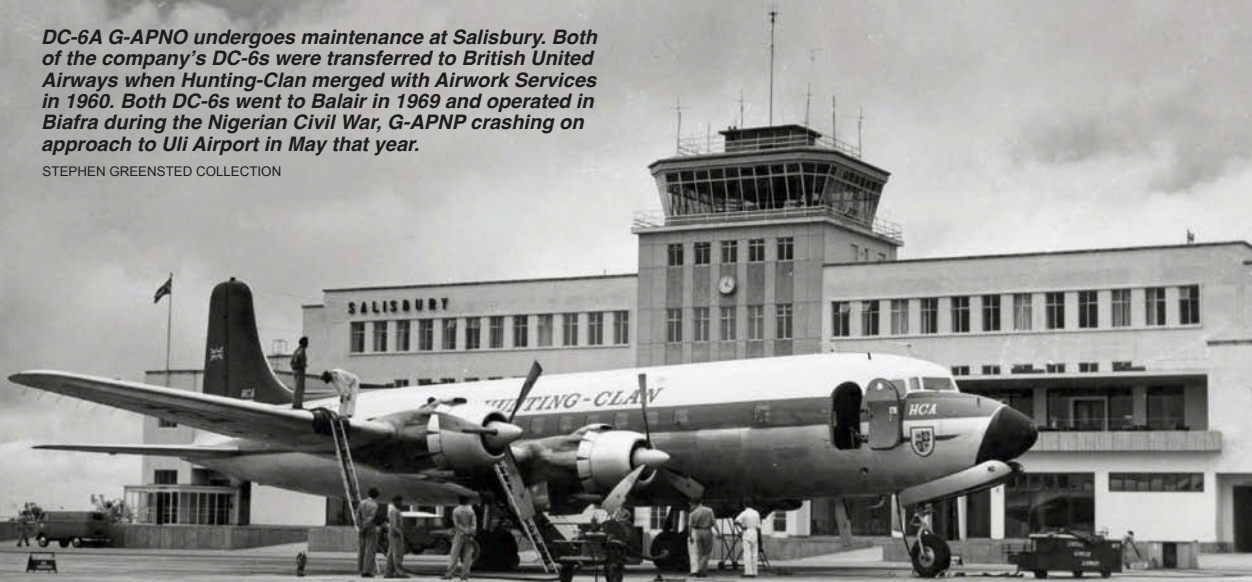
Vickers Viscounts and Bristol Britannias — were added to the fleet, everything changed. On the London—Accra route we went to the same cities along the West African coast but the journey took only two days in each direction, with just one night-stop for passengers and crew, at Las Palmas on Gran Canaria in the Canary Islands.

### THE GOOD LIFE

On the Nairobi and Salisbury services, passengers went straight through to their destination city, but the crews “slipped” (i.e. were replaced by another crew) at Benghazi in Libya and Entebbe. At the former we swam in the Mediterranean and lay for hours in the sun (in the days before anybody talked about the hazards of “too much sun”). The airline provided a sailing boat

**DC-6A G-APNO undergoes maintenance at Salisbury. Both of the company’s DC-6s were transferred to British United Airways when Hunting-Clan merged with Airwork Services in 1960. Both DC-6s went to Balair in 1969 and operated in Biafra during the Nigerian Civil War, G-APNP crashing on approach to Uli Airport in May that year.**

STEPHEN GREENSTED COLLECTION





for the crews slipping in Benghazi and more than once I was flattered when a couple of the crew, who were taking out the boat, called across to me: "Want to come with us?" It was only when we were out in the middle of the harbour that one of them would say "OK . . . pop over the side". "What?" I'd ask. "We want to practise 'man overboard'. You go over the side and lie in the water pretending to be unconscious, and we'll sail back and practise grabbing you and getting you into the boat".

During one slip in Benghazi we became friendly with a Royal Navy mine-detection and -disposal team which was clearing the harbour of World War Two mines. One evening, the senior officer told me that any mine they found was given a codename, and a signal was sent to

the Admiralty in London requesting instructions for its disposal, which depended on the type of mine. He said, "I'll name the next mine we find *Angela*". I didn't think he would actually do it — we'd all had quite a lot to drink that evening — but the very next day, they found a mine in Benghazi harbour and sent a signal to London describing its type and asking for disposal instructions. How I wish I had a copy of the signal that the Admiralty sent back: "Tow *Angela* out to sea and render harmless".

The next slip was at Entebbe. We had three or four days free there and, on one occasion, another air hostess and I rented a car and drove to Murchison Falls Game Reserve. Amazingly, as soon as we drove through the entrance, we turned a corner and there, crossing the track

***In late 1957 Hunting-Clan ordered two Bristol Britannia 317s, both of which had been delivered by November 1958. Registered G-APNA and G-APNB, these were painted in the colours of Hunting-Clan's parent company, the British and Commonwealth Shipping Group, and began commercial services in January 1959.***





right in front of us, were a couple of dozen elephants of all sizes. We stayed for two nights, sleeping in large tents that had a "thatched" roof over them, and in the mornings we found elephant droppings in front of our tent.

At Murchison Falls the Nile goes through a gap in the rocks that is only 20ft wide and drops 400ft in a series of cascades. A mile or two from the Falls is the location where part of *The African Queen*, starring Humphrey Bogart and Katharine Hepburn, was filmed in 1951. I went on the river in a boat that looked exactly like the one used in the film, and the boatman took us close — a little too close for my comfort — to a group of hippopotami. They looked calm and tranquil, floating in the river with just their ears and noses showing above the water, but it was known that sometimes they overturned the boats carrying tourists. There were crocodiles lying on the river banks nearby, so I was relieved when our boatman took us along the river, away from the hippos!

### MONKEY BUSINESS

From Entebbe we flew south to N'dola and Lusaka in Northern Rhodesia (now Zambia), and then on to Salisbury, where we had a day

off, before heading northbound, slipping again at Entebbe and Benghazi on the way to London.

One day, as we prepared to leave Entebbe bound for London, a different kind of passenger arrived. A young chimpanzee, about 18 months old, was being flown to London, then going on to a zoo in Germany. The young chimp arrived with a keeper from the animal sanctuary where the former had spent most of his life, his mother having been killed when he was only about three months old. I went down the front steps to see the chimp, and as I crouched beside him, he put his hand out to hold mine. He was loaded into a shipping crate and placed in the rear hold of the Viscount. As I made final preparations for the passengers to board, I heard human-like

sobbing coming from the rear hold (just behind the galley). The captain came aboard and I asked him "Did you see the manifest? You know we're carrying a young chimp today?" Yes, he knew, he said. I went on: "Please . . . come with me . . . listen". The captain listened. "Oh dear . . . we can't have that. We're not full. Keep three empty seats together in the first row and we'll move the crate up there and strap it in".

That day we had many children aboard, so



*Viscount 833 G-APTC at one of the Safari Service stops. Following the 1960 creation of British United Airways the former Hunting-Clan Viscounts continued to operate on the Safari routes until they were replaced by Britannias in October 1961. The Viscounts were transferred to troop flights from Gatwick to RAF bases in West Germany.*

BRIAN ROBBINS





BRIAN ROBBINS

*A superb photograph of Viscount 732 G-ANRT at Salisbury. The airport was officially opened on February 5, 1957, although it had been used by airline traffic extensively for the previous six months. On July 1, 1960, Hunting-Clan and its subsidiaries were officially merged with those of Airwork to form British United Airways, based at Gatwick.*

after take-off I went to each of them and told them, "We have a baby chimpanzee on board today. If you are very good, you may come, two at a time, and sit next to his crate. You must not touch him or put your fingers anywhere near him. If you do, you will go straight back to your own seat". All the parents told me afterwards, "The children have never been so good on a long flight . . . they never once said they were bored".

We were one of the first airlines to paint the tails of our aircraft a bright colour — ours were painted bright red, adding the company logo and the Union Jack. Crews working for BOAC would take great delight in gathering round us whenever we met down the route and, parodying an old song, sing "Red Tails In The Sunset". We got our own back a few months later when they painted the BOAC aircraft tails navy blue. When they put the Union Jack on the tail, they found it didn't stand out against the dark blue, so they outlined the flag with white. We loved pointing out to BOAC crews that when a ship flies the Union Jack with a white outline it sends the signal: No pilot on board!

### STIRRED . . . BUT NOT SHAKEN

As an independent airline, charter flights formed a major part of our business. These could be anything; a football team, the Prime Minister and Cabinet members, film units and so on. On film charters the technical team (lights, sound, cameras) were always aboard. Sometimes the stars travelled with us, sometimes they preferred to go on a separate flight.

A charter to Nairobi early in 1959 carried the unit which was to film *Tarzan's Greatest Adventure* in East Africa. The eight or nine actors on board included Gordon Scott, who played Tarzan. The others were all male "young unknowns". A few weeks later, when they'd completed location filming, I went to Nairobi to bring them back to London. One of the young actors paid me a lot of attention, stopping me each time I went past, coming back to the galley to chat. Just before we landed at Heathrow, he handed me the flight's menu — closed — and said "Miss Austin [my maiden name], I've put a special message in there for you". We were about to land, and I forgot all about it until the next morning. I still have it. The special message reads: "Miss Austin, I love you, Sean Connery".

Obviously, taking the slow Safari Flight to East or Central Africa was not the way to go if you had an emergency, but for people travelling on annual leave or on holiday, it was a wonderfully leisurely way to make the journey. Passengers loved it and came back year after year, and because we stayed with them overnight, they got to know us, and we got to know them. When we stopped operating the three- and four-day Safari services, it was truly the end of an era.



### ACKNOWLEDGMENTS

The Aviation Historian would like to thank Stephen Greensted, Colin Higgs, Brian Robbins, David H. Stringer and Capt Dacre Watson for their invaluable help with the preparation of this feature





# A Vintage Vantage Point...

**TONY BUTTLER** has always lived near Evesham in Worcestershire, and in an idle moment decided to trace the town's aviation history. A visit to the Flightglobal website revealed the story of a German chocolatier, a balloon and an early aerial photograph

**I** HAVE LIVED NEAR the town of Evesham in Worcestershire throughout my life. The availability of the Flightglobal Archive website ([www.flightglobal.com/pdfarchive](http://www.flightglobal.com/pdfarchive)) has given access to a fabulous supply of information in the form of scans of every page from every issue of *Flight* magazine and *Flight International* produced since the publication started in 1909. A spare moment prompted a keyword search for Evesham and, to my delight, revealed a view of the town taken from the air on the front cover of the issue for January 13, 1912. The print quality in 1912 was not great of course, but it was still good enough to show a lot of detail and how the appearance of the town

had changed since the picture was made. It was almost certainly the first such photograph to have been made of Evesham.

## Gustav Stollwerck

The picture was supplied to *Flight* by Consul Gustav P. Stollwerck and was taken during a trip made in his balloon *Dunlop* on August 13, 1911. This flight, with four other passengers, covered 165 miles (265km) and reached Newtown in Wales at 1205hr, the start having been made at 0300hr, so one assumes that the Evesham photo would have been taken at around breakfast time. Fortunately, I was able to track down a scan of the original photograph at the *Stiftung Rheinisch-*

**OPPOSITE PAGE** *The photograph of Evesham taken from the balloon Dunlop by Gustav P. Stollwerck at breakfast time on August 13, 1911. It appears to have been a beautiful sunlit morning.*

RWWA, COLOGNE

**RIGHT** *Balloonist and pioneer photographer Gustav Stollwerck in the basket of a balloon — possibly Dunlop — at an unknown location circa 1911. Stollwerck is the middle gentleman in the basket.*

RWWA, COLOGNE

**BELOW** *The front cover of the January 13, 1912, issue of Flight, featuring Stollwerck's photograph of Evesham. The weekly magazine promised more images from Stollwerck in following issues.*



*Westfaelisches Wirtschaftsarchiv zu Köln — RWWA, the Rhine-Westphalia Economics Archive in Cologne — which holds the Stollwerck photographic collection.*

Gustav Peter Stollwerck lived from 1872 to 1951 and was one of the five Stollwerck brothers whose company, Messrs Stollwerck Brothers Ltd, was, in 1911 — and still is — a major German chocolate manufacturer, with annual production in 2012 of around 100,000 tonnes of chocolate. At the time of the photograph's publication Stollwerck was the German Consul to Great Britain and had just been awarded the Mortimer Singer Cup, a trophy presented by Mr A. Mortimer Singer for a Long Distance Balloon Competition, which was held between September 1 and December 31, 1911. Stollwerck's flight in August may have been a practice trip, and one assumes that balloons were still not a common sight in the Worcestershire skies of 1911, as they are today.

When the Evesham photo was taken the camera was pointing in a southerly direction and shows in particular that a high percentage of the housing which today exists around the south part of the town was yet to be built. A second bridge was also constructed across the River Avon in 1928. There were no cars in those days either!

As the periphery of the picture tends to go out of focus one assumes that the camera used may have been something like a Box Brownie, but hopefully a reader with a knowledge of the history of

photography, and who can identify the signature trademarks of various cameras, may be able to fill in the gaps.

Other issues of *Flight* from 1911–12 include several more aerial views. For example the cover for the July 1, 1911, issue has balloons taking off from Hurlingham on May 27, and the cover of the August 19, 1911, issue shows images of Wandsworth Gas Works and the Short Brothers balloon factory at Battersea. The latter's pages also include views of Vauxhall Bridge and the Kennington Oval cricket ground. Stollwerck's balloon *Dunlop* also appears in the July 1 issue.

## An aerial photography pioneer

Stollwerck's photography provided some of the earliest images of Britain taken from the air, although *Flight* had published other examples as early as 1909. In 1911 powered aeroplane flight in Britain was still in its infancy and the

frail machines of the day, with their response to even the mildest of turbulence, would not have made good stable platforms for photography. Balloons were at the time the only way to take such photographs. Gustav Stollwerck was a pioneer and his images provide a valuable social record of the time, as well as a good story!



*The author wishes to thank Dr Christian Hillen of the Economics Archives of Cologne (RWWA) and the Flightglobal Archive for their help with this article*



# SECONDO'S SLOW BURNER



THE FIRST CAMPINI-CAPRONI C.C.2 AT GUIDONIA, VIAA AUTHOR

## CAMPINI, CAPRONI and the C.C.2

In the most in-depth article yet produced on Secondo Campini and his experiments with jet technology, **GREGORY ALEGI** explains how the Italian engineer became the first to design and build a two-seat, afterburner-equipped, long-range jet-powered aircraft — and why his unusual “motor-jet” system would ultimately prove to be a dead end

**“REACHING THE AIRFIELD** to continue the fine tuning of the aircraft, I rather unexpectedly found many people. The place was buzzing and everyone was anxious for news. I confess that at first I was a bit upset; but maybe it was just that crowd of onlookers that tickled my pride. I climbed aboard: I throttled the engine; the aircraft moved (and certainly none of the onlookers was persuaded that this heavy machine that made a high-pitched hiss, similar to the air-raid sirens unfortunately so familiar at the time, could get off the ground, while I was certain of it); I gradually increased the speed. I was very careful to keep it on the ground by imperceptible movements of the control column: I felt it lighten, but meanwhile the trees marking the end of the airfield were racing towards me with excessive speed (or so it appeared to me).

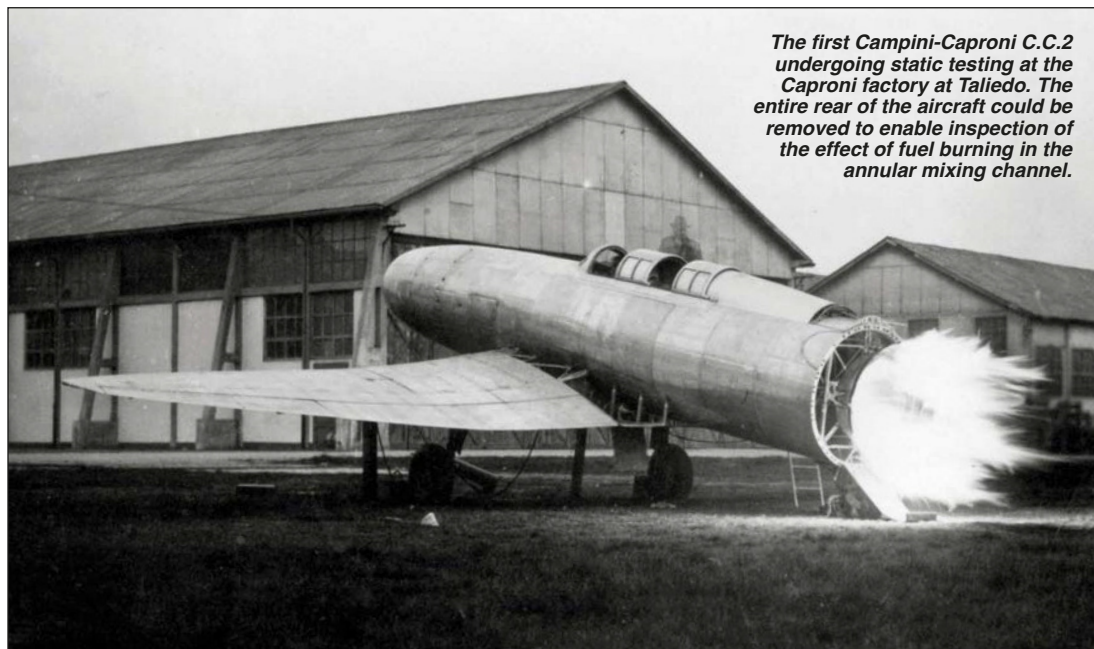
“My heart was racing. Finally the aircraft left the ground, cleared the trees and gained altitude. The dream of us all, of the designer, of the builder, of the workers who followed the manoeuvres with trepidation, had come true. And the era of the turbojet had begun.”

These are the words with which Mario de Bernardi, winner of the 1926 Schneider Cup in the USA, and Caproni chief test pilot, described



to pilot and journalist Raffaele Guzman the first flight of the Campini-Caproni C.C.2 (often also referred to as the N.1) designed by Secondo Campini (LEFT). Other parts of the interview had misdated the flight — the true date was August 27, 1940, not April 30, as de Bernardi had claimed — misrepresented the powerplant as a turbojet (which it was not) and claimed the glory of the first jet flight for himself and Italy. In fact, that honour belongs to Germany and Erich Warsitz, who, on August 27, 1939, had secretly flown the Heinkel He 178V1, which was powered by the 450kg (990lb)-thrust HeS.3b turbojet designed by Hans von Ohain. But the Campini machine flew nine months before the Gloster E.28/39, which was powered by a W.1 turbojet of about 385kg (850lb) of thrust designed by Frank Whittle.

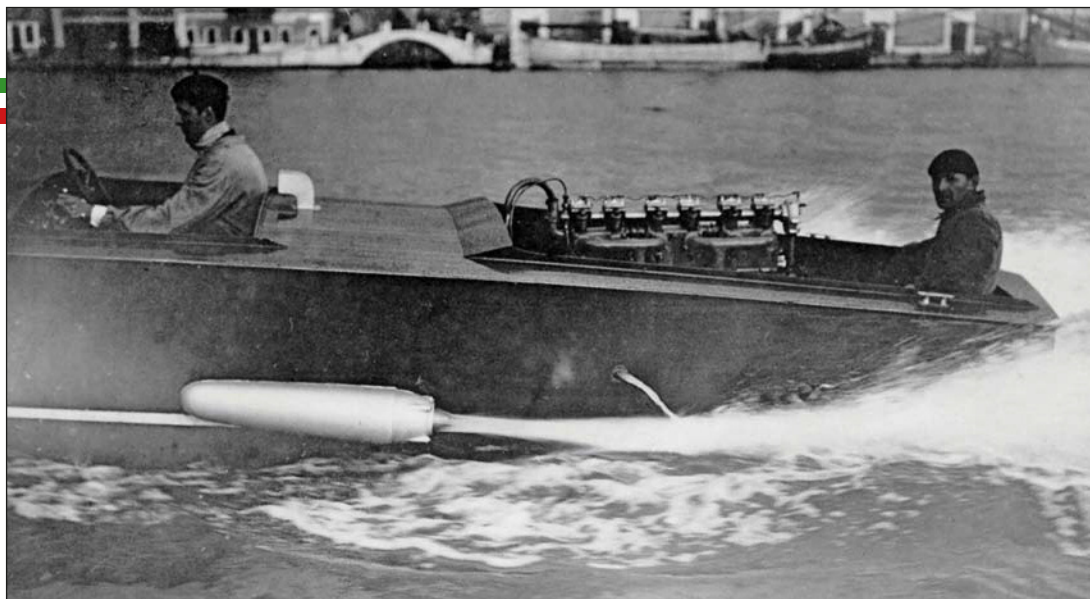
The three engineers — Campini, von Ohain and Whittle — were all attracted to jet propulsion to achieve speeds and altitudes much greater than those possible with piston engines, the theoretical limitations of which were already clear. Campini was the only one among them to design, build and fly an aircraft powered by his own propulsion system. In fact, drawing upon the extensive help and resources of manufacturer Caproni, Campini succeeded in achieving a number of firsts in jet



*The first Campini-Caproni C.C.2 undergoing static testing at the Caproni factory at Taliedo. The entire rear of the aircraft could be removed to enable inspection of the effect of fuel burning in the annular mixing channel.*

PHOTOGRAPHS VIA AUTHOR UNLESS OTHERWISE STATED





**ABOVE** Campini's "jet powerboat" of 1931 undergoing tests in Venice. Drawings of the Isotta-Fraschini engine and its installation in the boat's jet-propulsion unit were part of a consignment of material sent from France to Singapore aboard Japanese submarine I-29 in April 1944 as part of an Axis technical co-operation agreement.

aircraft technology: it was the first to be publicly revealed; the most powerful early example of the new technology and was the first two-seat jet aircraft. It also incorporated the first afterburner and was the largest early jet aircraft. No mean achievement, and one which gave the Campini-Caproni team worldwide publicity and enduring fame. Unfortunately, despite ministerial and industrial support, the machine's complexity and size penalised its performance, which would ultimately shake official confidence in the designer.

## BACK TO THE BEGINNING

The Campini story had started a decade earlier with the publication of a long study on jet thrust in the August to December 1930 issues of the journal *L'Aeronautica*. The author was the young Secondo Campini, born in 1904 in Bologna, the university of which he graduated from with a degree in civil engineering in December 1928.

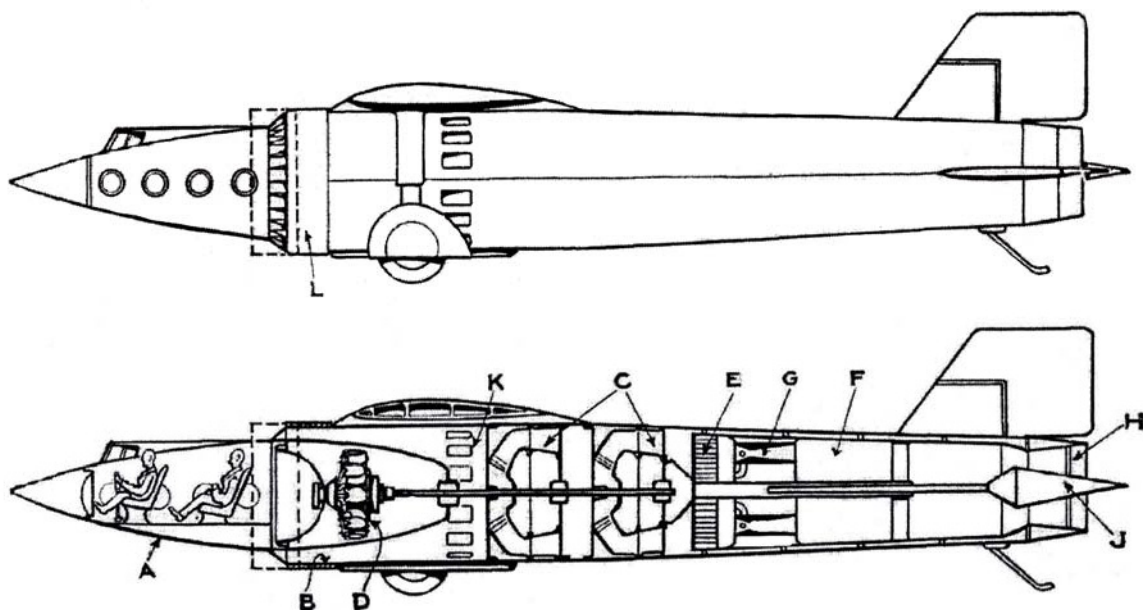
Initially accepting a post as a teaching assistant in hydraulics at his old university, Campini quickly turned his interests towards jet propulsion and compiled the aforementioned monograph for *L'Aeronautica*. In mid-1930 he moved to Milan and on January 20, 1931, filed his first jet aircraft patent, which covered the basic concept later used in all his designs. In its most basic form, the Campini system can be described as first taking in the air and compressing it dynamically by way of the aircraft's movement relative to it; then

compressing the air a second time, mechanically; the compressed air is then heated before expanding and being released to generate thrust. A movable Pelton-type bullet allowed the exhaust diameter to vary, increasing or diminishing the airflow pressure and velocity.

Nine days after the patent application, on January 29, 1931, Campini contacted Italian aviation pioneer and manufacturer Gianni Caproni (**LEFT**), to outline the basic principles of his power system and a four-step development programme, without immediate results. In 1931 Campini and his two brothers formed *Velivoli E Natanti A Reazione* (Jet Aircraft and Boats — Venar), in Milan, the company filing patents in Italy, France, Great Britain and Japan (in 1932), the USA (1935) and Germany (1937). The first contract received by Venar was not for an aircraft but for a boat. In



May 1931 the *Regia Marina* (Royal Navy) awarded Venar a research contract to design, build and test a marine version of the new powerplant. Lacking any workshops, Campini immediately sought a partner to build his "jet powerboat". The choice fell on the *Costruzioni Meccaniche Riva*, an experienced hydraulic engineering company in Milan which also made available its technical director, Ing Tranquillo Novelli. Using a hull built by the Cinti boatyards, an Isotta-Fraschini Asso 200 six-cylinder inline aero engine and two waterjets manufactured by Riva, the speedboat was built in the second



ABOVE Campini's American patent drawings, dated December 17, 1935. Key: A) ovoid cabin; B) enshrouding cylinder; C) two-stage centrifugal compressor; D) radial engine; E) rectifier radiator; F) combustion space; G) annular mixing channel; H) discharge nozzle; J) cone for varying nozzle orifice; K) controlled lateral orifices.

TAH ARCHIVE

half of 1931. The hydrojet released high-pressure water through two lateral exhausts, the shape of which were similar to that of the rear fuselage of the later aircraft. When tested in Venice in April 1932 the Campini jet boat achieved 28kt, a speed comparable to a boat with a conventional engine of similar output. The navy placed no orders, but it did veto the sale of the design outside Italy.

Meanwhile, Venar had also approached the Air Ministry about a new powerplant that promised to offer aircraft very high speed and altitude. This concept must have proved interesting to the *Regia Aeronautica* (Royal Air Force), or at least to the Minister of Aviation, Italo Balbo, who had provided a fascinating glimpse of the future in his May 19, 1931, budget speech to the Senate:

"Speeds of 500km/h [310 m.p.h.] are already widely exceeded and in a few years will become common to all aircraft. We are so certain of this that we look even beyond and are studying, not just on paper, the extraordinary possibilities of high-altitude flight."

These words may or may not have referred to Campini, but on February 5, 1934 — three months after Balbo had left the Air Ministry for Libya — the *Regia Aeronautica* signed a 4.5 million lire contract with Venar for the supply, by December 31, 1936, of a test fuselage and two flying aircraft "powered by the Campini jet system". Compared to other contemporary experimental contracts this seems remarkably generous; indeed, the two Campinis cost about twice as much as the two Piaggio P.23 four-engined bombers ordered in May 1934 at a total price of 2.35 million lire.

Being still without workshops, Campini turned

again to Caproni and reached a formal agreement with him on May 25, 1934. This allowed Campini to draw upon the considerable design and technical resources of the Caproni group while retaining the rights to his patent and design. Caproni, who was always forward-looking and fascinated by technological progress, would support this and other Campini projects for more than a decade with technical and financial resources far exceeding those made available by the *Regia Aeronautica* contract. According to a September 1947 summary Caproni lost nearly 7.4 million lire on the original jet contract.

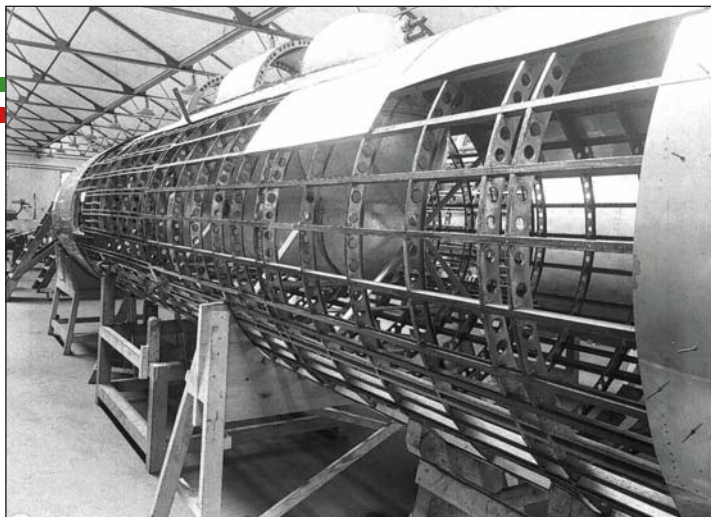
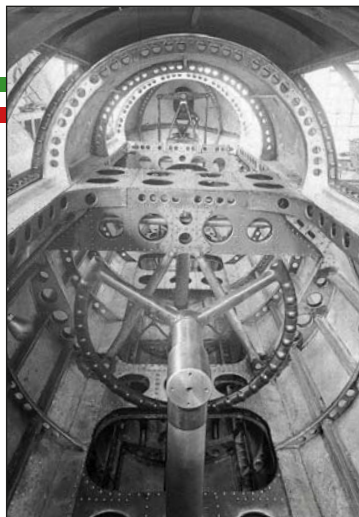
Because the Campini aircraft were built in the Caproni factory, piloted by Caproni's chief test pilot and supported by the Caproni flight-test organisation, they would later be widely referred to as Campini-Caproni or Caproni-Campini aircraft. This proved particularly annoying to the designer, who complained and threatened to sue from as early as 1941 to at least 1961. By 1973, however, it appears he accepted the Campini-Caproni name as satisfactory.

## DEVELOPMENT UNDER WRAPS

In late 1934 Campini set to work at the *Aeroplani Caproni* factory at Taliedo, near today's Milan-Linate airport. According to Mario de Bernardi, work was undertaken in secrecy in a closed building with a sign proclaiming "Entrance strictly forbidden to anyone".

Campini first finalised the configuration of the aircraft, which emerged as a large tandem two-seater with a fixed faired undercarriage. Scale models were tested in the Caproni windtunnel





**ABOVE LEFT** The interior of one of the two C.C.2 prototypes at Taliedo. **ABOVE RIGHT** The fuselage was of conventional construction, made up of a cylindrical structure of 62in (157.5cm) outer diameter at its widest point, within which was fitted an inner skinning of 56in (142.25cm) diameter, according to later Allied measurements.

before being sent to the Guidonia test centre near Rome for additional aerodynamic testing. In parallel, Campini built a one-third-scale proof-of-concept engine driven by an 8 h.p. electric motor, complete with a fuel-injected combustor. The scale engine was run during 1935–36 at up to 6,100 r.p.m., producing a thrust of 14.5kg (32lb) that rose to 20kg (44lb) with “reheat”. These results led Campini to estimate an output of 700kg (1,540lb) thrust for the full-size engine, rising to 900kg (1,985lb) with the additional input from the burners. To understand the attraction of the promised thrust levels it should be recalled that — as Stanley Hooker told Ernest Hives of

Rolls-Royce in August 1940 — a 1,000 h.p. Merlin engine provided a Spitfire with only about 380kg (840lb) of thrust.

Work on the test fuselage reportedly began in May 1934, but this must have been extremely preliminary considering that the powerplant was still under development. In contrast to the highly advanced propulsion concept, the fuselage was an extremely conventional steel structure with non-stressed skins. It was also very large, with a length of 11.84m (38ft 10in), a diameter of 1.66m (5ft 6in) and a 0.84m (2ft 9in) air intake.

Although the patents envisioned the use of either piston or turbine engines to drive the



**ABOVE** The static test fuselage outside the workshop at Taliedo in 1937. The fuselage comprised four main sections: the air intake in the nose; the three-stage ducted fan unit; the main section housing a circular coolant radiator, Isotta-Fraschini engine and “afterburning” equipment, and the tail section with adjustable “bullet”.

# SECONDO CAMPINI AIRCRAFT DESIGNS 1931-42

BELOW IS A tentative list of Secondo Campini's proposed aircraft designs, most of which were never built. Campini employed a somewhat flexible designation system relating to his numerous sketched designs

## 1931

Unnamed generic aircraft design  
Unnamed generic six-seat aircraft

## 1933

**CS.500V** Two-seat experimental aircraft  
**CS.600** Two-seat experimental aircraft

## 1934

**Campini** Two-seat experimental aircraft with Isotta-Fraschini Asso 750 engine. Later renamed Campini 1

## 1937

**Campini 2 (C.C.2)** Two-seat experimental aircraft with Isotta-Fraschini Asso 750 engine. First flown on August 27, 1940, with test pilot Mario de Bernardi at the controls. This aircraft is often also referred to as the **N.1**

## 1939

**CS.3** Tri-motor bomber with Isotta-Fraschini Asso L121 engines and single supercharger  
**CS.4** Tri-motor bomber with "Campini units" driven by Isotta-Fraschini Asso L121 engines  
**CS.5** Helicopter  
**CS.6** Helicopter

## 1942

**CS.7** Single-seat fighter with two "Campini units" driven by Daimler-Benz DB605A engines  
**CS.8** Single-seat fighter with two "Campini units" driven by DB605A engines  
**CS.10** Single-seat fighter with two "Campini units" driven by DB605A engines  
**CS.11** Bomber with two "Campini units" driven by DB605A engines; variants proposed in 1943 using either 1,550 h.p. Reggiane L103 piston engines or 3,350 h.p. (sic) Campini turbines

compressor, in practice Campini decided to avoid the metallurgical challenges of a gas turbine, a decision to which he stuck but which would ultimately prove very limiting. In May 1935 Campini requested from the Regia Aeronautica a 12-cylinder Isotta-Fraschini Asso XIR piston engine. The air force replied that it was still in the experimental phase and offered the 18-cylinder Asso 750R which was indeed used for the 1936 ground thrust tests. The Asso drove a two-stage compressor, each of its discs carrying six 40cm (16in) blades with ground-adjustable pitch. According to Mario de Bernardi, the idea of a propellerless aircraft was met with skepticism even within the Caproni company.

On April 28, 1936, the Air Staff enquired about progress and on December 6 that year, far behind schedule, Campini reported that construction of the fuselage was completed but that he needed another six months. In theory, the two flying aircraft were supposed to have been delivered by the end of the year. Campini submitted his preliminary report to the air force on April 3, 1937, and official engine tests started on April 27 before a military board presided over by Gen Ing Enrico Bonessa and including *Sottotenente* Ing Ermanno Bazzocchi, who would later design the Macchi MB-326 and MB-339 jet trainers.

Meanwhile, in Germany in March 1937 von Ohain made the first test runs of the technological demonstrator he had started building in April 1936 with a budget of only 1,000 Reichsmarks, and Frank Whittle made the first runs of his own engine on April 12, 1937.

To complicate matters further the Campini test results were lower than anticipated. The specially-built dynamometer recorded 650kg (1,430lb) of thrust — about 93 per cent of the expected thrust

— and only 730kg (1,609lb) — 81 per cent — with the burners on. Additionally, the burners used five times more fuel than anticipated. The Campini system was clearly not performing as hoped, and on July 9, 1937, Campini was forced to ask Under Secretary Giuseppe Valle to extend the contract deadline and increase the purchase price by 25–30 per cent to cover a similar increase in costs. The contract was thus amended on December 27, 1937, changing the delivery date to December 31, 1938, and increasing the price to 5.22 million lire. By 1942 other changes would bring the total contract value to 8.55 million lire, almost double the original amount.

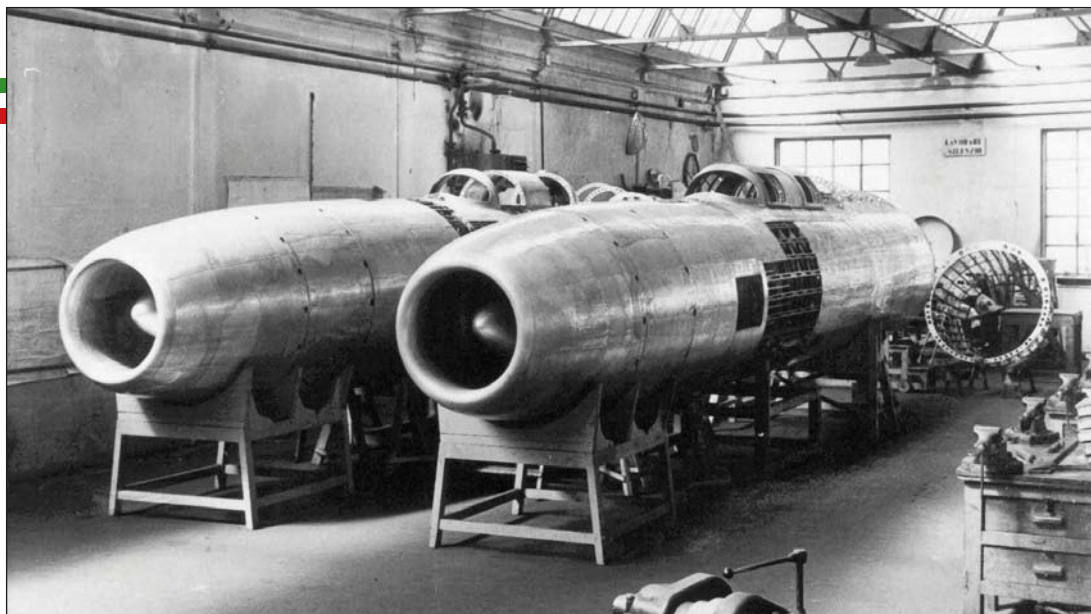
## ENTER THE C.C.2

Following the disappointing test results Campini extensively redesigned his aircraft between May and October 1937, to the point where it became a new type, designated Campini-Caproni 2 (C.C.2), which was longer (12.1m/39ft 8½in), narrower in the fuselage (1.57m/5ft 2in) and with a smaller air intake (72cm/28in) than the test item.

The fuselage became a semi-monocoque aluminium structure, with internal skinning to minimise thrust-losses owing to the airflow hitting frames, stringers and other excrescences. The powerplant incorporated a new three-stage compressor and a second radiator to enhance thermal efficiency. The design now called for a 900 h.p. V-12 Asso L.121 RC40, quite different from the previous W-18 Asso 750. Unfortunately, all this contributed to the tripling of the empty weight from the 1,200kg (2,645lb) envisaged in the 1934 contract to some 3,500kg (7,700lb) on the actual aircraft.

In its final form the C.C.2 emerged as a two-seat experimental aircraft with a cylindrical fuselage





**ABOVE** The two C.C.2s nearing completion in their adjacent jigs in the Caproni workshop at Taliedo. Both went on to undergo extensive ground testing, and both undertook flight testing. Given the Caproni construction numbers 4849 (No 1) and 4850 (No 2), they were later given the military experimental serials MM.487 and MM.488 respectively.

with circular formers and stringers, double-skinned in aluminium and comprising four sections: air intake; compressor and duct; central section with engine and airtight cockpit and finally the tail section with combustion chamber, lined with steel for protection. The pilots were seated in a sealed but unpressurised cockpit with independent tandem seats, dual controls and individual rearward-sliding hoods. Flight instrumentation was very basic and there was no provision for radio.

The empennage, which was the subject of much work in both the development and test-flying phase, consisted of a two-spar tailplane which, like the fin, was mounted to the fuselage via three attachments. Both the rudder and elevators were horn-balanced, with frequent changes in shape during development. The single-piece wing had an elliptical planform and thick aerofoil, with two spars placed at 15 per cent and 59 per cent of the wing chord. The ribs were built up from channel section and had lightening holes. Four-piece trailing-edge flaps were incorporated and the outward-retracting undercarriage, with oleopneumatic shock absorbers and air-operated brakes, was of taildragger configuration. The tailwheel was retractable.

The Campini powerplant used the Asso engine with a multiplier splined in place of the reduction gear to turn an axial compressor with three fixed stages, each with 15 vanes with hydraulically variable pitch, and three rotating stages with 12 ground-adjustable 27.5cm (11in)-long blades. A radiator placed behind the compressor cooled the

piston engine. The unit included a rear vaporiser-burner (itself the subject of many experiments to identify the best fuel/vaporiser combination) and the hydraulically-extendable Pelton bullet or cone which controlled the dimensions of the exhaust nozzle. Significantly, Campini described the system as a *motoreattore* (motorjet), indicating that he was not deceiving himself or others by suggesting he had created a turbojet.

### THE TWO PROTOTYPES

The two fuselages were built side by side and were identified internally as Nos 1 and 2. This has led to confusion, with many authors mistaking the construction numbers with designations (i.e. Campini Type 1 or Type 2). The Caproni factory assigned its own construction numbers, 4849 and 4850 respectively, and the Regia Aeronautica later assigned military serials MM.487 and MM.488 in the block reserved for experimental aircraft.

Although the air force appears to have decided not to repeat the static-thrust tests, development and construction was still painfully slow. The completion date (December 31, 1938) slipped again, enabling Heinkel, Warsitz and von Ohain to claim the world's first jet flight. A new date was set for October 31, 1939, but it was early 1940 before the C.C.2 was ready to fly. Test pilot de Bernardi recalled how one day he found Campini, who was "usually smiling and serene", to be "unusually worried". He explained:

"He told me that he had not been able to find a pilot willing to take on the responsibility of test-flying the aircraft; he had not made, nor was he

# The Campini-Caproni C.C.2: a piston-powered jet engine

## How the engine works

- 1** Air enters an intake at the nose of the aircraft
- 2** Inside the intake the air passes through a three-stage compressor powered by an Isotta-Fraschini V-12 piston engine
- 3** The compressed air passes through the fuselage until it enters an "afterburning" system where fuel is added to the compressed air and ignited
- 4** The heated and expanding gases are directed out through a tailpipe creating jet thrust to propel the aircraft
- 5** An adjustable "bullet" is used to change the cross-sectional area of the tailpipe outlet and control the jet thrust

Air intake housing

Guide vanes

Three-stage compressor with variable-pitch blades

Isotta-Fraschini piston engine

### Fuselage interior

Forms an air duct connecting the compressor with the "afterburning" section

Fuel injectors

"Afterburning" section

Adjustable "bullet"

Tailpipe

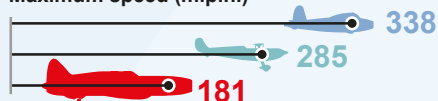
A comparison with a contemporary turbojet and a Caproni piston-engined biplane fighter highlights the C.C.2's weaknesses

Caproni Ca.165

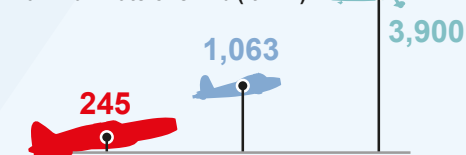
Campini-Caproni C.C.2

Gloster E.28/39

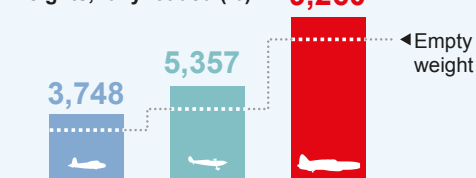
Maximum speed (m.p.h.)



Maximum rate of climb (ft/min)



Weights, fully loaded (lb)



Graphic: Ian Bott  
www.ianbottillustration.co.uk





**LEFT** *Secondo Campini (in hat and overcoat) gives last-minute instructions to test pilot Mario de Bernardi before a test flight of one of the C.C.2s. One of Italy's most distinguished aviators, de Bernardi chalked up many of the nation's aeronautical achievements. In 1959, aged 65, he suffered a heart attack while flying an aerobatic routine in Rome; he managed to land the aircraft but died shortly afterwards.*

**BELOW** *The coloured fascas on the fuselage, later replaced by a stylised black variant, suggests this is the second prototype, possibly during its initial taxiing tests on August 8, 1940. This aircraft made its first flight on August 27 the same year, to become the world's first two-seat jet-powered aircraft to fly.*

making, a specific offer to me because he feared that I would also refuse, which would have discouraged him definitively. I did not hesitate. I shook his hand warmly and told him I was ready; not only that, but to show him my trust, I would do it without any remuneration."

The test pilot dated this episode as happening in April 1939, but it probably occurred later. Considering that the aircraft was weighed for the third time on February 10, 1940, and the engines were eventually delivered to Taliedo in March 1940, an April 1940 date seems more likely.

It appears that at this point it was decided to use aircraft No 1 for the static tests. (Confusion exists about the exact division of flights between the two aircraft. Unfortunately de Bernardi's logbooks of this period are lost and Caproni documents offer contradictory information which is interpreted differently by various authors. The explanation here is believed to be consistent with the current state of research). According to a 1950 Caproni document, No 2 began engine runs on June 28, 1940, with *Motorista* (engine technician) Casalini. By July 8 the engines had been run for

2hr, and on July 26 Campini informed the Constructions Directorate that both aircraft were "ready to undertake the contractual tests". Aircraft No 2 was then moved by road the short distance from Taliedo to Linate, where de Bernardi made the first taxi run on August 8. The 60min run included undercarriage adjustments and enabled take-off run estimates. Casalini again ran the engine on August 25 (for 60min) and August 27 (80min).

At 1935hr, during the second test of August 27, de Bernardi left the ground after a 700m (3,000ft) ground run and climbed at the modest rate of 1.5m/sec (300ft/min) before making a perfect landing. During the 10min flight he noted that the elevator was over-sensitive, so the incidence of the tailplane was decreased before the contract flight on September 16, again without burners.

Casalini continued to make engine runs during September 17-19, but a few days later de Bernardi fell into the empty lift-shaft of his hotel and broke a heel, his injury stopping the flying programme for several months. On October 14 de Bernardi was awarded the Gold Medal for



One of the few air-to-air photographs taken of the type, this possibly shows the first prototype, c/n 4849, during its flight from Taliedo to Guidonia in November 1941. Note that the cockpit canopies remain open — most Italian aviators of the time disliked enclosed cockpits.



Aeronautical Valour. The citation mentioned his illustrious career crowned by the Campini test flight. The medal was pinned to de Bernardi's chest by Benito Mussolini on November 30.

While de Bernardi (**INSET BELOW**) recovered from his fall, further engine runs were made during October through to December, possibly to test the burners. On September 3 Campini had asked the Air Ministry for permission to respond to inquisitive journalists, claiming that news of the flight was beginning to circulate. The first public reports appeared on October 17, 1940, in *Il Popolo d'Italia* — the daily founded by Mussolini in 1914 — followed on December 2 with a report in the *Corriere della Sera*.

## FROM MILAN TO ROME

Casalini continued to ground-run the engine during early 1941, making ten tests in January, three in February, five in March and three in April. These tests probably served to test and tune the burners in preparation for their first flight test, which was made by de Bernardi on April 11, 1941, using aircraft No 1, which replaced No 2 in the flight programme. The flight lasted 10min and was followed by three more ground runs. A second burner flight was made on May 5, the extra thrust shortening the take-off run and improving the initial climb to 5m/sec (960ft/min). Ten days later, on May 15, the Gloster E.28/39 flew for the first time.

The C.C.2 made its sixth flight on June 1, 1941, a short display for Air Force Ministry Under Secretary Francesco Pricolo's visit to the Taliedo factory. The burners were lit, but their use continued to be limited by local overheating issues. Aircraft No 1 made eight more ground runs during May and June, while No 2 made one in May and another in July. The engine in No 1 proved troublesome and was replaced during the summer, but on its first flights (on October 19–20)

the new engine also backfired and vibrated. In August No 2 made three more engine runs on the ground, followed by the official contract flight on August 31, 1941, which probably just fulfilled a contractual need. In any case, this is the last recorded flight of No 2.

By this time attention was focused on delivering No 1 to the Guidonia test centre for its official evaluation. On October 19, 1941, de Bernardi climbed to 1,500m (5,000ft) and on November 6 to 2,500m (8,200ft), while on November 7 he made a 1hr endurance test to verify the possibility of a ferry flight to Guidonia. The carburettors, tappet

valves and r.p.m. multiplier were also overhauled before de Bernardi was allowed to carry the world's first jet passengers, *ingegnere* Giovanni Pedace (November 5–6) and *commendatore* Guasti (November 29). Pedace was the secretary of the Aviation Pioneers Society while Guasti was Gianni Caproni's nephew. It having been decided to turn the flight into a promotional event, official timekeepers were summoned together with photographers from the state film propaganda organisation *Istituto Luce*, while Pedace, a keen stamp collector, obtained a special postmark for what would become the first jet airmail.

The aircraft took off from Linate at 1447hr on November 30 and landed at Guidonia at 1658hr, covering the 476km (295 miles) between the two airfields in 2hr 11min, averaging 217km/h (135 m.p.h.). The actual flight distance was greater, because adverse weather caused a diversion to Pisa where — contrary to many modern accounts — the aircraft did not land. In later years Pedace fondly recalled that de Bernardi had let him fly the machine for about 15min.

During the Milan–Guidonia flight the aircraft burned 675lit (150gal) of fuel out of 800lit (175gal) available. The flight to Rome created a sensation.







**ABOVE** Another photograph of Mario de Bernardi and engineer Giovanni Pedace aloft in the first prototype. Campini explained after the aircraft's arrival that "high speed was not the object of this first public flight", which was just as well as it managed an average speed of only 135 m.p.h. over the 295 miles between Taliedo and Guidonia.



**LEFT** Giovanni Pedace (left) and Mario de Bernardi in the cockpits of the first C.C.2 in November 1941, when they made the Taliedo-Guidonia flight.

On December 5 Mussolini, always alert to the value of propaganda, asked de Bernardi to fly the aircraft over central Rome, even prescribing the course he should follow. To this day, many older Romans remember the silver aircraft whistling over the rooftops. In the early morning of December 6 Mussolini inspected the aircraft at Guidonia, accompanied by Caproni, and watched de Bernardi demonstrate the machine. A week later it was the turn of Generals Eraldo Ilari, Amedeo Mecozzi, Ing Zappa and others.

Over the next few months the Guidonia test centre put the C.C.2 through a standard evaluation programme to ascertain its performance. The aircraft was fitted with recording equipment on

December 12, 1941, and received its new military serial, MM.487, on December 30. The programme began on January 7, 1942, but the aircraft was plagued by minor problems and was often grounded. In addition to undertaking its limited test flight programme, the aircraft was often paraded for ceremonies or foreign delegations.

On April 9, 1942, during a speed run at 1,000m (3,300ft), the radiator overheated and forced de Bernardi to make a precautionary landing. Unfortunately the port undercarriage unit failed to extend which forced him to land on the starboard mainwheel alone. The pilot's ability helped minimise damage and the aircraft was back in the air by June 10, 1942, when a top speed

**The first C.C.2 following its forced landing on April 9, 1942. The damage was restricted to the tailwheel and its fairing, parts of the rear fuselage and one wing rib in the undercarriage recess. A valve in the port wheel-retracting gear had seized owing to dry packing leathers.**



## CAMPINI-CAPRONI C.C.2 DATA

Data for the C.C.2 vary considerably because of the aircraft's frequent modifications; those used here represent the final configuration of the aircraft

### Dimensions

Span	14.63m	(47ft 11¾in)
Length		
(excluding bullet)	11.10m	(36ft 5in)
(bullet at maximum extension)	13.0m	(42ft 8in)
Height	4.72m	(15ft 6in)
Wing area	36m <sup>2</sup>	(387.5ft <sup>2</sup> )

### Weights

Empty	3,640kg	(8,025lb)
Max take-off	4,200kg	(9,260lb)

### Performance

Max speed (burners off)*	292km/h	(181 m.p.h.)
Climb to		
1,000m (3,280ft)	9min (burners on) *	
1,000m—4,000m (3,280ft—13,120ft)	44min (burners off) *	
Service ceiling	4,000m	(13,300ft) *

\* No official comprehensive performance figures were recorded

of 292km/h (181 m.p.h.) was recorded. Fuel consumption with the burners lit was measured on June 20: the Campini used 550lit (120gal) in just 21min, at a rate of 26.2lit/min (6gal/min). On July 28 the undercarriage collapsed on the ground owing to a fracture of a tube in the valve block of the retracting gear. The machine's last known flight was made on August 27, 1942, after which the aircraft remained at Guidonia.

In November 1942 Gen Federico Zapelloni, Chairman of the *Reale Unione Nazionale Aeronautica* (Royal National Aeronautical Union — Runa — as the former Aero Club of Italy had been renamed in an effort to avoid the foreign word "club"),

informed de Bernardi that the *Fédération Aéronautique Internationale* (FAI) had entered the flight in the official list of "controlled flights". For it to be declared a record, added Zapelloni, it would be necessary to wait for the International Sporting Commission to meet to establish the as-yet non-existent "jet aircraft" category.

### AFTER THE ARMISTICE

Campini also co-operated with Caproni on other projects, the most interesting of which was a jet-powered midget submarine conceived in conjunction with de Bernardi. Hoping to use it for its special forces that had repeatedly hit British shipping at Alexandria and Gibraltar, the Italian Navy ordered two prototypes. The project was taken over by the Germans after the 1943 armistice but there are conflicting reports as to its fate. According to a Caproni memo of September 30, 1947, the midget submarines "remained incomplete at the end of the war", and Campini oversaw the recovery of "all the material existing in the workshops of Riva [del Garda], that is the assault craft and workshop tools", nothing of which was, however, recovered.

Local sources in the Lake Garda area tend to associate Campini with a mysterious submarine lost during testing or at the end of the war. In any case, Caproni claimed to have spent some 21.6 million lire on the project but to have received only 3 million lire from the Germans, resulting in an eye-watering 18.6 million lire loss.

Around 1939 Campini had sketched a "helico-taxi", again in both piston- and turbine-powered variants. Interestingly, Campini proposed to eliminate counter-rotating and tail rotors by using compressed air ejected through the tips of the rotor blades, a system applied in France after

*The first C.C.2, serialled MM.487, at Guidonia before Italy's capitulation in September 1943. In his official intelligence report for Mediterranean Allied Air Forces after his visit in June 1944, Sqn Ldr F.E. Pickles noted that "the Experimental Establishment at Guidonia is completely demolished" and that Campini had moved his workshops to northern Italy.*







**ABOVE** The C.C.2 at Guidonia, with its c/n, 4849, and serial, MM.487, on the rear fuselage. When the airfield was overrun by the Allies, it was found dismantled with components scattered among the demolished remains of the once-busy Experimental Establishment.



**LEFT** With the nose intake section removed, the C.C.2 reveals its three-stage axial-fan assembly. Despite the Italian Air Ministry and Caproni having spent a combined total of nearly 16m lire over eight years on the project, Pickles said it "did not merit serious attention".

the war to the SNCASO 1100 Djinn. It appears that Campini only sketched out the idea. Limited work was also undertaken on a gas turbine engine rated at 3,500 h.p. (sic) at 6,000m (20,000ft), with an eight-stage centrifugal compressor and nine-stage turbine. Two of these were ordered in 1942 but were never completed. This is confirmed by the 1944 Allied interrogation of Colonel Pier Luigi Torre, head of the Guidonia engine department, who reported that "some experimental work on individual parts" had been made in 1943 "but a complete engine was not run". His description of "a multi-stage centrifugal compressor, with a multi-stage turbine driving an airscrew" confirms that Campini was in fact working on a turboprop engine. The designer estimated its weight at 1,000kg (2,200lb) but the *Stato Maggiore* (Air Staff) believed 1,550kg (3,400lb) would be more likely. Caproni spent 386,462 lire on this project, which remained in the purely experimental phase and was largely lost at the end of the war.

Stored in a hangar at Guidonia, MM.487 was found, wrecked, by the Allies after the occupation of Rome in June 1944. The damage was caused by either an Allied bomber attack on the airfield (local sources list 29 raids between October 1943 and May 1944, and even suggest that the C.C.2 was destroyed on January 13, 1944), or blown up by the Germans before abandoning the field. In either case, it is known that the wreck was examined on June 18, 1944, by Sqn Ldr F.E. Pickles of Britain's Ministry of Aircraft Production,

attached to Mediterranean Allied Air Forces intelligence to study jet development in Italy. Pickles compiled a preliminary report and arranged to transport the remains to Farnborough, where they arrived in October 1944. In January 1946 the aircraft was prepared for museum storage, but in November 1947 corrosion was so advanced that it was decided to scrap the airframe. It was then moved to RAF Newton in Nottinghamshire and disposed of in 1949. Parts of the fuselage and of the fan section were noted in 1951 in a scrapyard in the Nottingham area. No parts survive.

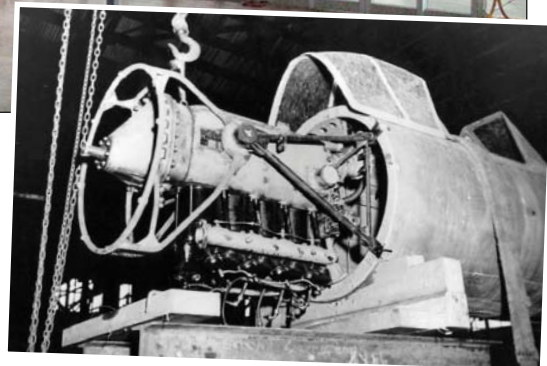
The other example, MM.488, survived the war in excellent condition in the Milan area, possibly at the *Caproni Aeronautica Bergamasca* at Ponte San Pietro. In September 1946 the *Direzione Costruzioni Aeronautiche* of Milan enquired about it, and in April 1952 it was eventually recovered by the *Aeronautica Militare* (Italian Air Force, no longer Royal following a Republican victory in the June 1946 referendum). The aircraft was displayed statically at many airshows and exhibitions, eventually entering the collection of the Italian Air Force Museum. Since 1977 it has been on permanent display at Vigna di Valle representing Italy's part, albeit unsuccessful, in a fascinating technological race. It is painted to represent No 1 during the historic Milan—Rome flight.

Against all odds, the 1937 test fuselage has also survived. It apparently lay at Taliedo until 1950, where it was found and recovered. By the mid-1950s it was on display in Milan in the National



**ABOVE** Preserved in excellent condition, the second C.C.2, c/n 4850, later serialised MM.488, is displayed at the Museo Storico dell'Aeronautica Militare at Vigna di Valle on Lake Bracciano, north of Rome.

**RIGHT** The Hitachi four-cylinder inverted inline engine which formed part of the Tsu-11 powerplant of Japan's Yokosuka Ohka Model 22. The Engine Test & Field Support Shop at the Yokosuka Naval Air Arsenal knew of Campini's work but developed the Tsu-11 powerplant independently. JOE PICARELLA COLLECTION



Museum of Science and Technology, where it briefly shared the aviation hall with MM.488. Engineless and in poor condition — but still on its original trolley — it may still be seen there today.

The only other aircraft to fly using a Campini-type engine was Japan's Yokosuka MXY7 Ohka Model 22 flying-bomb, which was powered by a Tsu-11 unit driven by a 100 h.p. four-cylinder inline piston engine. The type was built in very limited numbers and never entered service.

### CAMPINI'S FINAL YEARS

During 1945–46, in an attempt to return to aeronautical production after the war, Caproni re-established contact with Campini (RIGHT) and spent 4 million lire in support of further research into his earlier ideas for an industrial gas turbine and a heli-car powered by either a 120 h.p. CNA engine or a Campini turbine. Neither of these projects came to fruition and eventually Campini left for the USA, where he remained for about a decade before returning to Italy, where he continued to work until he retired in 1970, aged 66. He was frequently sought and interviewed by journalists, to whom he appeared moody, swinging from extreme kindness to fits of bad temper, particularly if the merits of his design or his first jet claims were challenged.

In 1944 Luigi Torre described Campini as “a



keen academic engineer without practical experience”. What seems clear today is that the decision to proceed with a complete aircraft — which at contract signature had been just roughly outlined — before perfecting the new powerplant, led to massive cost over-runs and delay. It also appears that Campini approached jet propulsion entirely as a research programme, and progressively disengaged from any of the more practical considerations.

On the other hand, it should not be forgotten that American engineers failed to see, as Campini had, the close connection between their very sophisticated turbochargers and the turbojet, so that Gen Henry “Hap” Arnold eventually had to ask the British to provide access to Frank Whittle's technology, which in turn provided the basis for all American jet engine development.

Campini died in Milan in 1980, followed a year later by his wife Vittoria.



### ACKNOWLEDGMENTS

The author would like to thank Giovanni and Maria Fede Caproni, Capt Fiorenza de Bernardi, Dr Ing Giorgio Apostolo, Giancarlo Garelo and the late Messrs Umberto Ucelli, Alberto Briganti, Giancarlo Marcozzi and Roberto Bettio for their help with the preparation of this feature over many years



*A poor-quality but extremely rare photograph of the sole Ago C VII in its original German markings. The Ago company was unusual for the time in having a woman, Elisabeth Wörner, as one of its directors.*



# BEFORE & AFTER

**ROGER TISDALE and ARVO VERCAMER trace the history of the sole Ago C VII, which wore both German and Estonian markings during its long career**

**I**N 1912 AEROWERKE Gustav Otto (Ago), based at Johannisthal in Berlin, became a separate division of Flugmaschinenwerke Aerowerke, founded in 1911 by Gustav Otto, son of Dr Nikolaus Otto, inventor of the four-stroke engine.

During World War One Ago built a series of reconnaissance aircraft, the first being the Ago C I twin-boom pusher biplane. The two-seat C IV of 1916, fitted with a powerful 220 h.p. Benz Bz IV six-cylinder in-line liquid-cooled engine, was fast and well-armed, but its tapering fabric-covered wings made it complicated and labour-intensive to build. It was unstable in the air and disliked by its crews, and only 70 of the 250 examples ordered were serving by September 1917.

In an attempt to overcome some of the type's design shortcomings, a C IV was modified during

1917 to accommodate a redesigned tail section with revised wing and tail bracing. The wing-mounted radiator was also relocated to the leading edge of the wing and the new design was given the designation Ago C VII. The changes proved unsuccessful, however, and Ago ended the war producing components for other aircraft companies rather than its own designs.

The sole C VII survived and was sold to the Estonian government in 1919. It was shipped to Tallinn along with two DFW C Vs in early October 1919. Records indicate that the C VII entered service with the Estonian Air Defence Force on October 4, 1919, and, despite one or two crashes during its career, remained in service until it was retired in 1929. The C VII thus became the longest-serving of the aircraft designed by Ago during World War One.



*A previously unpublished photograph of the C VII in Estonian service in 1922, with its serial number, 35, prominently displayed on the fuselage.*



The C VII's wings tapered uniformly from the maximum chord at the centre section to the minimum chord at the square-cut wingtips

BELOW Had it entered service, the C VII would have been armed with a forward-firing Spandau MG 08 machine-gun operated by the pilot and a Parabellum free-firing MG 14 machine-gun on a fixed mount for use by the observer

The sole C VII was originally painted in a typical German grey finish with the Cross pattée (or Iron Cross) on the fuselage, fin, top side of the upper wing surfaces and under the lower wing

ABOVE The C IV's original tail arrangement, which was replaced with a smaller fin on the C VII

The triangular Estonian national marking was aligned parallel with the upper wing's leading edge

BELOW The C VII, given the serial number 35, was painted in the dark green colour used on many Estonian aircraft in the post-First World War period

Classic German over-design: Ago's wing for the C IV and C VII was formed of I-section ribs, each of which was a different size in each panel, and the distances on each rib where the spars intersected were different

RIGHT Radiator and exhaust detail of the C VII's 220 h.p. Benz Bz IV liquid-cooled engine

ABOVE During its ten-year career with the Estonian Air Defence Force the C VII was often armed with a Lewis machine-gun

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# UNDER DEVELOPMENT

In 1936, 16-year-old Les Harris left the Welsh valleys to enlist with the Royal Air Force. Qualifying as a Photographer in March 1939, he joined the flying-boats of No 203 Sqn in Iraq. Using his father's logbooks **ALAN HARRIS** details the young Welshman's first RAF overseas posting — an adventure that took him from Barry to Basra and beyond

*The Singapore III was the last of Short's long line of biplane flying-boats for the RAF. Based on the single-finned Singapore Mk I and II, the Mk III made its first flight in June 1934 and entered RAF service with No 230 Sqn at Pembroke Dock in April 1935. This example, K6921, served with No 209 Sqn until it was struck off charge in August 1939.*

TAH ARCHIVE



**T**HE 16-YEAR-OLD shivered against the wind swirling around the railway platform. Since his father had

died six years earlier in a mining accident, he had spent most of the time at home. He had been too ill to go to school and he had hardly left the streets around his home town of Barry in the Vale of Glamorgan, Wales, except occasionally to travel the eight miles to Cardiff. Something had urged him to break out and so he waited for the train that would take him on the adventure of a lifetime — in the Royal Air Force.

### **A CAREER IN FOCUS**

After initial selection at West Drayton, Middlesex, Aircraftman Leslie Raymond Harris (551385) was one of 32 selected to go to the



School of Photography at RAF Farnborough on No 6 Entry as Boy Entrants. It was 1937. Over the next 39 years he would do many exciting things in the RAF — (nearly) went all around the world; was awarded the British Empire Medal and earned a Branch Commission — but his short attachment to No 203 Sqn at Basra in Iraq always remained vivid in his memory.

At its most northerly point, the Persian Gulf is fed by the Shatt al-Arab, a vast expanse of water into which the Tigris and Euphrates rivers flow, and on the western shore of which is the port of Basra, where the RAF base was located. The squadron was equipped with five Short Singapore III all-metal biplane flying-boats. On a beach trolley on dry land the Singapore was huge — 90ft (27m) wingspan,

**ABOVE** Aircraftman Les Harris, aged 19, in Arabia in late 1939. Harris completed the year-long RAF photography course at Farnborough in January 1938, before being sent to Boscombe Down to hone his photographic skills. In March 1939 he received his first overseas posting with the Short Singapore flying-boats of No 203 Sqn.

AUTHOR'S COLLECTION







**ABOVE** Taken by a hand-held F.24 camera from a Singapore III, this photograph shows the 203 Sqn hangar and slipway at Basra in 1939, with another Singapore beside the hangar. To the left is the war memorial removed by Saddam Hussein in 1997. **BELOW** The badge of 203 Sqn, whose motto was Occidens Oriensque: "West and East".

more than 64ft (20m) long and nearly 30ft (9m) tall — and looked too big and cumbersome to fly.

The crew of six comprised the captain, a second pilot/navigator, a wireless operator and three air gunners. Two of the gunners would usually be maintenance crew (an engine fitter and a rigger) while the third could be a gunner/photographer. Aircraftman Harris was nominated to perform any air photography tasks. The main service camera at the time was the F.24, which was introduced in 1925 and lasted well into the 1950s. It was used in hand-held mode to take oblique photographs and could also be mounted on the airframe for vertical shots (see opposite page).

After a familiarisation briefing on the aeroplane, and plenty of practice inside the hull as it sat at its mooring, it was time for Harris's assessment flight. He would be expected to take a number of hand-held images of a selection of local landmarks and they would be assessed for quality, technique and intelligence value. This is how he remembers it:

"Everything seemed very matter of fact: check

and secure the equipment; pre-flight checks. Then the engines started. What a thunderous noise! I realised that we were only using two engines to start with as we moved away from the mooring buoy; engines three and four started as we moved towards the take-off area.

Enclosed in the all-metal hull, I had never before heard such bedlam! The crew started chuckling and the person next to me bellowed: 'We're only taxiing!'"

The aircraft climbed to its usual cruising height of 3,000ft (900m) and the trainee was told to get ready to earn his pay.

The nose hatch was difficult to open — outwards — with a wind force of some 80kt against it, but Harris was soon plugged into the intercom. The problem was that the "standard" position for taking pictures involved the operator standing on top of the gunnery platform with his torso and head sticking out of the aircraft into the wind. He quickly

learned how to maintain balance while keeping his arms and the camera away from the aircraft frame to eliminate vibration. The remaining targets were captured without incident and the aircraft headed back to base.



## EYE IN THE SKY THE UBIQUITOUS F.24 CAMERA

THE F.24 CAMERA (an example of which is seen attached to the outward-opening nose-hatch of a Short Singapore, **RIGHT**), was the primary RAF aircraft camera for 30 years. With outline design by the Royal Aircraft Establishment at Farnborough and detailed design and production by Williamson Manufacturing (London) of Willesden, the type was introduced in 1925. The prefix stems from a decision made towards the end of the First World War, when it was decided to use letters to differentiate between different camera types. Thus "F" was used to indicate that the camera used film, as opposed to "P" (for plate cameras) and "G" (for gun cameras).

The F.24 was a smaller and lighter design than the F.8, which entered service in 1919, giving a format of 5in x 5in rather than the 7in x 7in of the earlier model. The main component units of the F.24 were a body with a roller-blind focal-plane shutter, gearbox, film magazine and lens cone.

Stripped down, it was light enough at 20lb (9kg) to be used as a hand-held device, although it was usually mounted in the aircraft, where it was paired with a magazine which held film for up to 250 exposures. The standard camera had an 8in lens, although 6in and 10½in were also available. Longer lenses were introduced later: 14in in 1937; 20in in 1940 and 36in in 1942.

### FROM FLYING-BOATS TO FIGHTERS

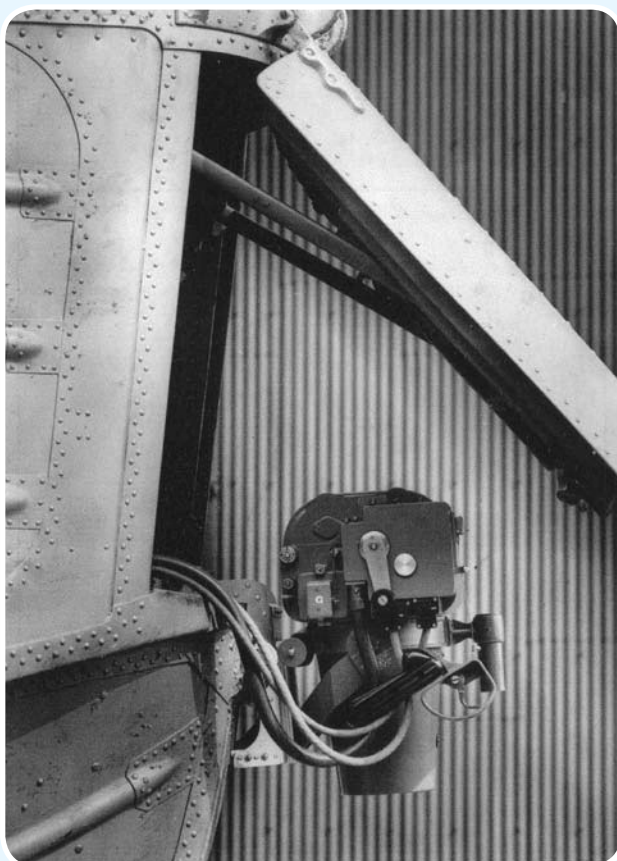
The most common siting for the camera was in the fuselage, using the longer lenses to take vertical or oblique photographs. Some aircraft, such as the Supermarine Spitfire, featured the F.2, with the smaller lens, mounted in the wing. There was also a twin installation with an F.24 set either side of a slipper tank mounted on a Spitfire to take forward-facing oblique images.

The camera could be fitted with a choice of four shutter blinds with different widths and tensions giving a range of exposure speeds from 1/60th to 1/1000th of a second. During the Second World War the F.24 was also manufactured by pioneering British aerial camera company Vinten, while Eastman Kodak designed and produced a lighter version which served with American forces as the K.24. In 1942 the F.24 was further developed into the F.52 with a larger format, 8½in x 7in, and a larger magazine with 500 exposures. The F.52 was used primarily in high-altitude reconnaissance with either 36in or 40in lenses fitted.

Its relatively small format meant that the F.24 could not capture the high-definition images that were often required for photographic interpretation. Nevertheless it was a very reliable design and was affectionately regarded by aircrew and photographers throughout its service history until the mid-1950s, when it was retired. It was installed in the vast majority of Allied photographic aircraft during the Second World War, including the Spitfire, Hawker Hurricane, Bristol Blenheim, Avro Lancaster and de Havilland Mosquito. And, of course, the Singapore — although the latter required the camera to be fixed during flight and struck for landing.

### F.24 CAMERA DATA

**Format** 5in x 5in (127mm x 127mm) image **Shutter** Cloth roller-blind focal-plane type  
**Lenses available** included focal lengths of 3¼in, 5in, 6in, 8in, 10½in, 14in, 20in, 36in  
**Dimensions** length 15½in, width 9½in, height 10in **Weight** 20lb (9kg) stripped down







**ABOVE** Singapore III K4577 of No 203 Sqn on the step while taking off from Basra in August 1939. The type's first overseas posting was with No 230 Sqn to Alexandria, Egypt, in January 1935, and the Singapore IIIs of Nos 209 and 210 Sqns were used for anti-piracy patrols from Malta to protect British shipping during the Spanish Civil War.

The big surprise came towards the end of the 90min flight. Harris continues:

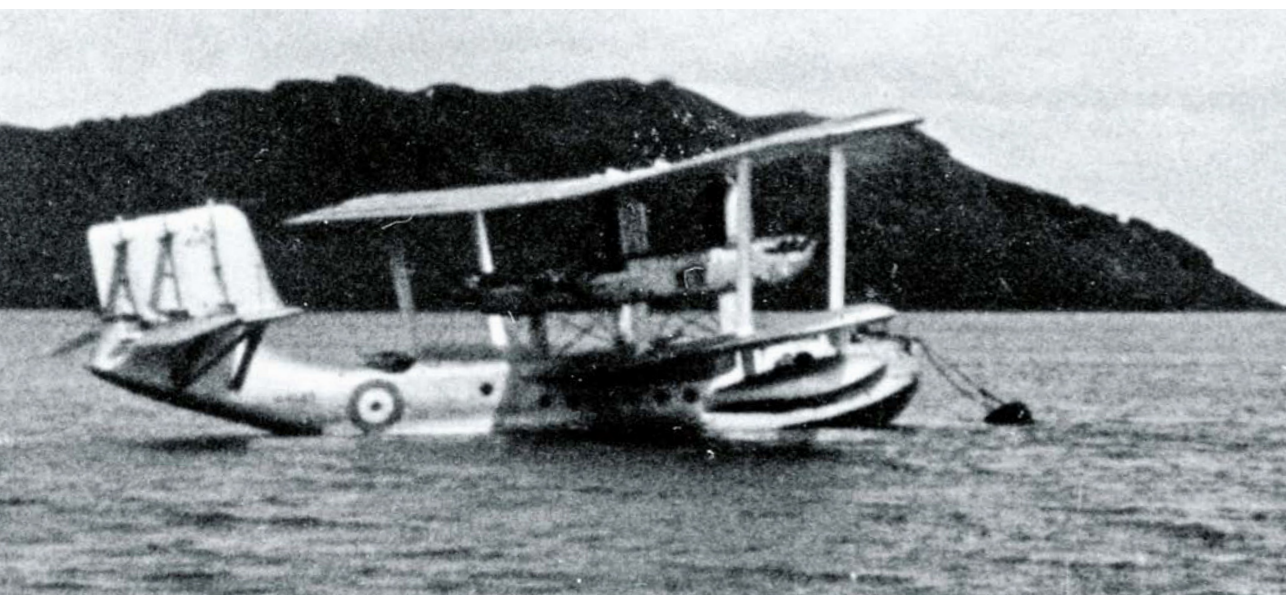
"I can still very clearly remember the relative silence as we approached the alighting area. The engines were throttled back and, as we lost speed, it was the wind that became the most dominant noise as the rigging started to 'sing'. There was a hefty thump as we touched the water and then I could feel the drag as the hull settled lower. We were down!"

#### GLOBAL EXPOSURE

Over the next few months the new arrival grew more accustomed to his dual role and had practice sorties both as a gunner and photographer. Four months later Harris was sent on a four-day detachment to Bahrain to perform a survey of the island, using the F.24 in its vertical mounting. The camera was operated by the navigator via an electrical cable, but first had to be fitted on the first step of the hull in the nose,

where the hull sweeps down and under. That simple statement hardly tells the complete story though; being a flying-boat, the aircraft could not land or take off while the camera was mounted. The photographer would have to go through to the nose-gunner's position, crawl across the gunner's platform, open the metal hatch in the bow, push the camera and his own torso through the hatch and then reach across and down to secure the camera to the bracket. After the aircraft had completed some dummy runs to determine the best interval between exposures, Harris was signalled to fit the camera:

"I managed to secure the camera at the second attempt, but was terrified of letting go of it! It took me several minutes to wriggle backwards to safety. I fitted the control cable and handed it to the navigator. I was feeling quite full of myself as I prepared to take some supporting shots with the hand-held oblique camera when I suddenly realised: I would have to do it all again in





**ABOVE** *Singapore IIIs of No 203 Sqn undergo maintenance on the slipway beside the hangar at Basra. Some 37 examples of the Singapore III were built, 19 of which were still in RAF service when war broke out in September 1939. Four of No 205 Sqn were sent to Fiji to become the nucleus of No 5 Sqn RNZAF, which used them until 1945.*

reverse to retrieve the vertical camera before we could alight!"

The photography went well and the camera was dismounted without incident. While this routine never quite became second nature, Harris grew into his new role of gunner/photographer as the squadron continued to exercise its peacetime maritime role.

### **WAR CLOUDS GATHER**

In August 1939 Harris and a number of other junior airmen were sent on detachment to a rest camp high in the northern hills of Iraq, close to the Turkish and Syrian border, on what was supposed to be a 14-day break. They set out with rifles and full kit and travelled by truck, train, aircraft and mule via Baghdad. The days soon fell into a pattern: up at 0600hr for parade, inspection and drill; a couple of hours at the rifle range and a free afternoon. This was to be the pattern for the next two weeks.

Except it wasn't. On day six the men were told to return to their units immediately because the political situation in Europe was worsening. The party made its way back to Baghdad, where each member was told to report to nearby Lake Habbaniya. This was a large expanse of water of 54 square miles (140km<sup>2</sup>), and sitting just off shore was a Singapore ready to take them straight to Basra, as No 203 Sqn had been ordered to deploy to Aden on the Arabian Peninsula (now part of Yemen).

The extra bodies and equipment were soon on board. It was late afternoon and the air was warm and still; the lake looked like a sheet of glass. The aircraft accelerated but, after an extended take-off run, the engines were throttled back. The aircraft turned for another attempt in the other direction. Harris remembers:

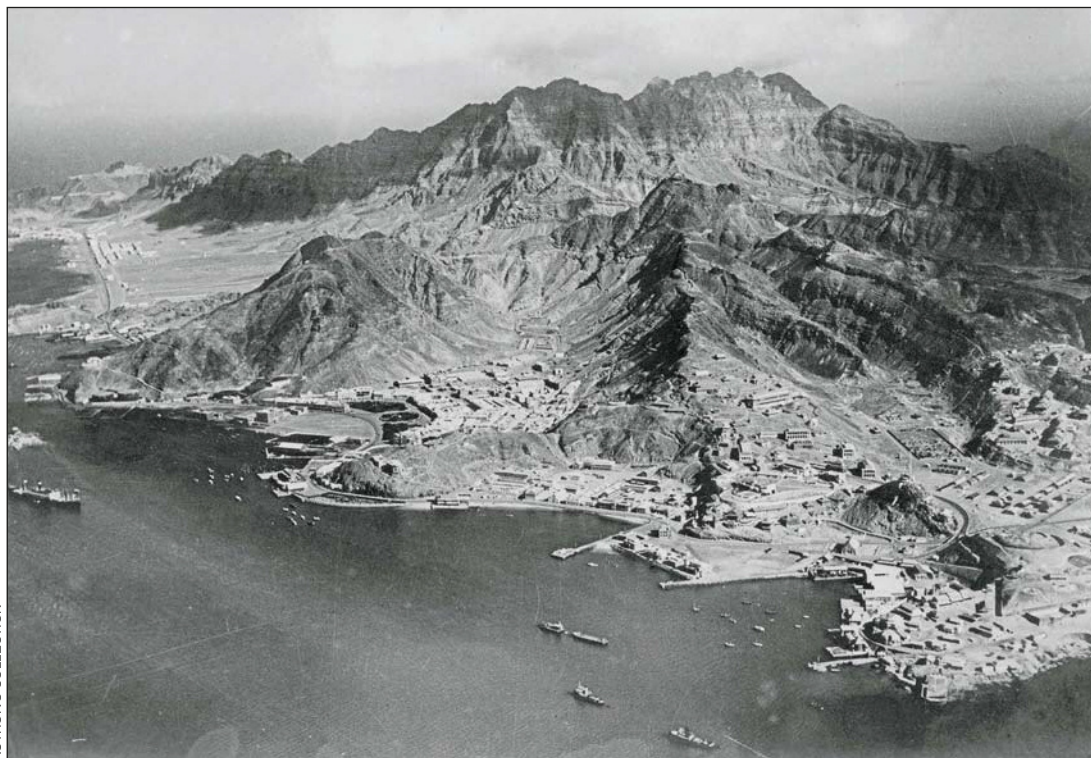
"There was no wind so we tried again in the opposite direction. We thundered along, the engines roared, the rigging howled and the

*A poor-quality but previously unpublished photograph of three of No 203 Sqn's Singapore IIIs at anchor off Aden in September 1939, just after the outbreak of war. The Singapores were soon put into "sand and spinach" camouflage and, following 203 Sqn's conversion to Blenheim IVs, were left in Aden Harbour, partly as a deterrent to raiders from Somaliland across the Gulf of Aden.*

AUTHOR'S COLLECTION







**ABOVE** A fine view of Steamer Point (now Tawahi), looking eastwards towards Aden's distinctive volcano, taken from a 203 Sqn Singapore III in 1939. Converting to Blenheims in late 1939, the unit flew fighter patrols over the Red Sea, mainly against Italian forces from June 1940. **INSET BELOW** Les Harris in front of a printing tent during his tenure with 203 Sqn, with which he remained after the unit's conversion to Blenheims, joining 208 Sqn in 1941.

water slapped. But again the captain throttled back and aborted the attempt. Obviously, the extra weight, high temperature and lack of wind were all conspiring against us getting airborne. We continued taxiing to get very close to the shoreline and we were all ordered to clear the gangway and cabin space before being told to move to the front of the aircraft. The captain said there was time for one last attempt and told us the plan."

The aircraft turned again and the extra passengers lined up outside the cockpit, facing aft. The engines started their thunderous roar. The captain shouted "Go, go, go!" and they went. From stem to stern they ran, some tripping over. But they all ended in the tail like a collapsed rugby scrum in a desperate attempt to rock the 'boat and raise the nose off the mirrored surface of the water. A few seconds later they realised that the stratagem had worked — the hull came unstuck from the water and the Singapore was airborne.

Back at Basra, No 203 Sqn's five aircraft and



crews were to fly to Aden via Aboukir in Egypt and the Suez Canal, while the groundcrews would make the trip by sea. On August 8, 1939, one of the unit's aircraft, K4584, hit the sea wall when attempting to take off from Aboukir harbour, killing three of the crew. On August 28 another, K8858, ran aground on a submerged reef at Hurghada in the Red Sea. It is believed to have been recovered and used as a decoy in Aden Harbour until December 1940, when it was struck off charge.

The groundcrews arrived at Aden on August 29 and five days later war was declared. The squadron had only three aircraft left and a difficult job to do which stretched men and machines to the limit. It was made even more difficult by the location. Aden Harbour is almost circular and formed from natural volcanic rock; the entrance is relatively small and sheltered from the wind by the rocky hills all around. The water in the harbour was usually completely flat, with hardly any movement. With the aircraft laden with bombs, ammunition and a full load of fuel,

taking off was somewhat difficult. The problem was partly resolved by using a couple of air-sea rescue launches to run ahead of the aircraft, criss-crossing the water to break up the surface and make it easier to unstick.

### SINGAPORES TO BLENHEIMS

This situation could not last and the squadron was soon re-equipped with Bristol Blenheim Mk IVs. Unfortunately the Blenheim had only one air gunner, who doubled as a radio operator, so Harris's plan to become a gunner was somewhat scuppered. The remaining three Singapores were left as deterrents in Aden harbour.

The days of the Singapore were numbered and most of the maritime squadrons were converted to the Short Sunderland, although No 205 Sqn continued to fly the Singapore (fittingly, in Singapore) until 1941.

Les Harris remained in the RAF until 1975. In 1983, as a retired octogenarian, Sqn Ldr L.R. Harris BEM RAF (Retd) was invited to visit No 203 (R) Sqn in its (still current) guise as a Westland Sea King helicopter air-sea rescue squadron. He was delighted to present the squadron with a colour painting, which he had commissioned, showing one of the unit's flying-boats getting airborne from the water off Basra in 1939.



## SHORT SINGAPORE III DATA

**Powerplant** 2 x supercharged 675 h.p. Rolls-Royce Kestrel VIII or IX (DR) liquid-cooled V12 piston engines in tractor configuration and 2 x supercharged Rolls-Royce Kestrel IX (DR) engines in pusher configuration, all driving two-bladed wooden propellers

### Dimensions

Span	90ft 0in	(27.43m)
Length	64ft 2in	(19.56m)
Height	23ft 7in	(7.19m)
Wing area	1,834ft <sup>2</sup>	(170.4m <sup>2</sup> )

### Weights

Empty	20,364lb	(9,237kg)
Loaded	28,160lb	(12,773kg)
Max take-off	32,390lb	(14,692kg)

### Performance

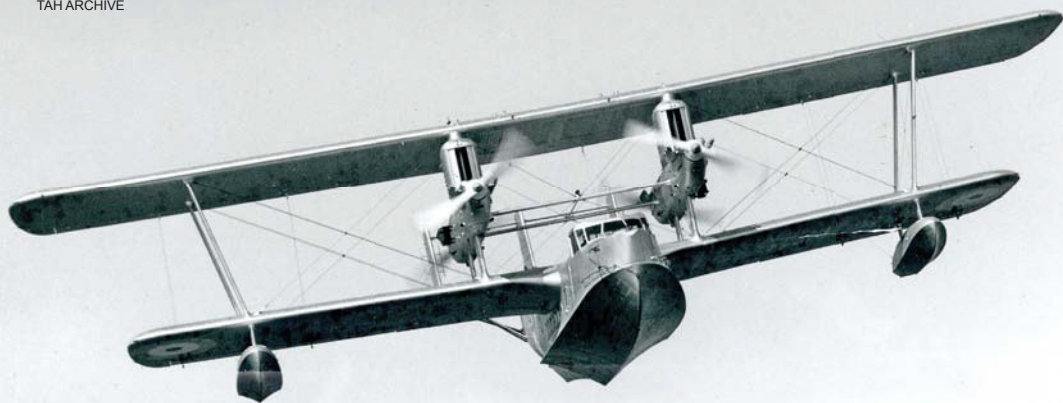
Maximum speed		
at 5,000ft	136 m.p.h.	(219km/h)
Cruise speed	123 m.p.h.	(198km/h)
Initial climb	700ft/min	(3.6m/sec)
Service ceiling	15,000ft	(4,570m)
Normal range	1,000 miles	(1,610km)
	at 105 m.p.h.	at 170km/h)

### Armament

3 x 0.303in (7.7mm) Lewis guns in bow, amidships and tail positions. Bomb load up to 2,000lb (905kg)

*With the unmistakable Rochester Bridge in the background, a Singapore III flies over the Medway after its completion at the nearby Short factory. The Singapore III would ultimately be replaced by the same company's superlative Sunderland, examples of which entered RAF service in the summer of 1938.*

TAH ARCHIVE









# ● ● ● elegant imperfection

As the Flourishing Fifties turned into the Swinging Sixties in France, the nation found itself enjoying a renaissance of confidence and prosperity; for Potez, the time was ripe to stake a claim in the burgeoning executive transport aircraft market with its shapely 840 turboprop. **ROD SIMPSON** explains how supreme optimism turned to sour disappointment as the 840 and its derivatives struggled to find a market

**LEFT** One of a sequence of superb publicity photographs of the Potez 840 taken by renowned French photo-journalist Jean Dieuzaide, who made his reputation capturing magnificent images of the Caravelle and Concorde. In this photograph of the 840 prototype Dieuzaide accentuates the slender, graceful nacelles of the aircraft's Turboméca Astazou turboprops.

PHILIP JARRETT COLLECTION

**I**N THE EARLY 1960s, before the advent of regional jets, there was a developing demand in Europe for small transport aircraft to fly on local route networks. In France, it was a time of decentralisation from the dominance of the overcrowded Paris area. This meant that industry was springing up in cities such as Clermont-Ferrand, Lyons and Toulouse — which brought an opportunity for small airlines to emerge and a requirement for efficient small airliners to serve the demand.

Fokker's twin-turboprop F.27 Friendship had led the way in the much-publicised "DC-3 Replacement" race and, by 1961, Handley Page and Avro were hot on its heels with the similarly Dart-engined Herald and 748 respectively. However, these were 55-passenger aircraft and, while the four-engined de Havilland Heron could carry 15 passengers, there were few types available with up to 24 seats, other than Grumman's G-159 Gulfstream — which was primarily intended for the business/executive market. The French company *Établissements Henry Potez* saw this as an important opportunity and embarked on the design of the Potez 840.

## The big (medium-sized) idea

Potez had a rich history, having built a range of successful light aircraft before the war, together with the Potez 631 light bomber which was manufactured at its Meaulte factory until 1940, when the Germans invaded France. After the war, Potez was an active engine manufacturer and developed the Potez 75 attack aircraft, although this did not go into production. Potez took over the ailing Fouga organisation in





**ABOVE** The first Potez 840 prototype, F-WJSH, in bare metal before flight vibration tests at the Potez-Air Fouga factory at Toulouse-Blagnac in 1961. The 840 was designed by Robert Castello, who had worked with Pierre Mauboussin on pre- and post-war Fouga designs since the mid-1930s, having joined the company from Dewoitine.

1958, building Magister jet trainers at Fouga's factories at Toulouse and Aire-sur-Adour under the group name Potez-Air Fouga. The company was in need of a profitable new project, however, which was why Henry Potez (**INSET RIGHT**) conceived the Potez 840 pressurised light transport. It had to be a robust aircraft, able to perform a high ratio of take-offs and landings, with a long airframe life, excellent performance and ease of maintenance. Responsibility for the design was handed over to Fouga's Robert Castello and the project, initiated in May 1959, was a private venture, entirely financed by Potez without French government support.

Powerplant choice would be crucial and, while Grumman had decided on a pair of 2,190 e.s.h.p.



Rolls-Royce Dart 529 turboprops to power the Gulfstream, Potez considered using a pair of homegrown Turboméca Bastans. However, the company eventually opted for a four-engined solution, using the brand new Turboméca Astazou turboprop in order to give better performance with one engine inoperative. As initially specified, the Astazou developed 440 e.s.h.p., which had increased to 530 e.s.h.p. by the time the aircraft was ready to fly, closely matching the Gulfstream's specification.

The Astazou was a slim, elegant engine with small frontal area and minimum drag, thus making it an attractive option. It was unusual in being a constant-speed turbine driving a three-bladed variable-pitch propeller. Each of the four engine nacelles was interchangeable.

**The competition** — Grumman's Dart-powered Gulfstream I made its first flight in August 1958, the type paving the way for a highly successful series of executive jets. This extremely attractive example was exhibited at the Paris Air Salon at Le Bourget in 1961.

MIKE HOOKS





**ABOVE** Also in the executive park at the 1961 Paris show was the 840 prototype, by now painted in an understated but stylish bare-metal, blue and white scheme, with the Potez emblem on the forward fuselage. The company was keen to promote the 840 as ideal for internal services linking provincial centres with major international airlines.

The Potez 840 was the first production aircraft to use the Astazou, but it was also fitted to early Pilatus Turbo Porters, the SIPA Antilope single-engined business aircraft and the SFERMA Marquis conversion of the Beech Baron. In its later versions the Astazou went on to be reasonably successful in powering the RAF's Scottish Aviation Jetstream fleet.

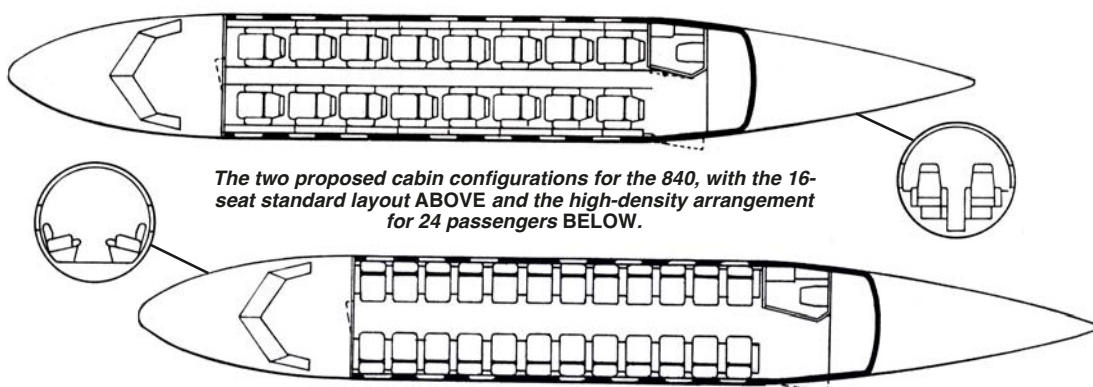
### Potez 840 construction

The Potez 840 was of all-metal construction with a high-aspect-ratio wing positioned under the fuselage and fitted with double-slotted NACA flaps. All fuel was contained in the wings in four tanks on either side with a combined total capacity of 338gal (1,537lit). The aircraft had a retractable hydraulically-operated tricycle undercarriage made by Messier; the main units, fitted with single wheels, retracted

inwards into recesses in the wing roots.

The overall design was highly streamlined and the fin was mildly swept. The cabin of the Potez was smaller than that of the competing Gulfstream, with a volume of 740ft<sup>3</sup> (21m<sup>3</sup>) compared with the Gulfstream's 1,040ft<sup>3</sup> (29.45m<sup>3</sup>). The 840's cabin length was also shorter at 22ft 8in (6.9m) and narrower at 5ft 8in (1.7m), compared with 33ft (10m) and 7ft 4in (2.2m) for the Gulfstream.

Despite having a dropped aisle the Potez did not have a full stand-up cabin and the mainspar carry-through had to be stepped over. Potez was to offer a standard medium-density version with 16 forward-facing seats designed for the purpose by *Société Industrielle pour l'Aéronautique* (SIPA) and all but one pair of seats (those adjacent to the mainspar) were beside a large triangular-oval window similar in shape to those used on



*The two proposed cabin configurations for the 840, with the 16-seat standard layout ABOVE and the high-density arrangement for 24 passengers BELOW.*





TAH ARCHIVE

**ABOVE** The second 840, F-WJSU, during a photographic flight. A number of modifications were incorporated on the second airframe; the windscreen shape was altered and an extra side-window was added to meet American FAA requirements. The aircraft's gross weight was also increased to 18,700lb and fuel capacity raised to 366gal.

the Sud Caravelle jet airliner. Castello's rather curious solution for a 24-passenger high-density configuration had the seats arranged in two rows of 12 with their backs to the cabin walls, facing the centre aisle. Entry to the cabin for both configurations was through a single port-side rear door and there was a baggage compartment in the tailcone.

### Prototypes and production

Construction of the prototype, Potez 840-01, commenced in 1960 at the company's factory at Argenteuil, near Paris. It was then transported to Toulouse-Blagnac and reassembled in the Potez-Air Fouga factory. Castello's slim and elegant aircraft, registered F-WJSH, made its first flight on April 29, 1961, crewed by chief pilot Jacques Grangette with flight test engineer Pierre Caneill and flight mechanic Gérard Garnault. By all accounts the aircraft had pleasant handling characteristics and the initial flight-test regime did not reveal any major faults.

The Potez 840 made its first public appearance at the Paris Air Salon at the end of May 1961. A second prototype followed, with a first flight on June 17, 1962. This aircraft (F-WJSU, c/n 02) incorporated a number of changes, including a longer nose to accommodate weather radar and an additional baggage compartment, additional cockpit side windows, a higher gross weight, more fuel and more powerful 600 e.s.h.p. Astazou XII engines.

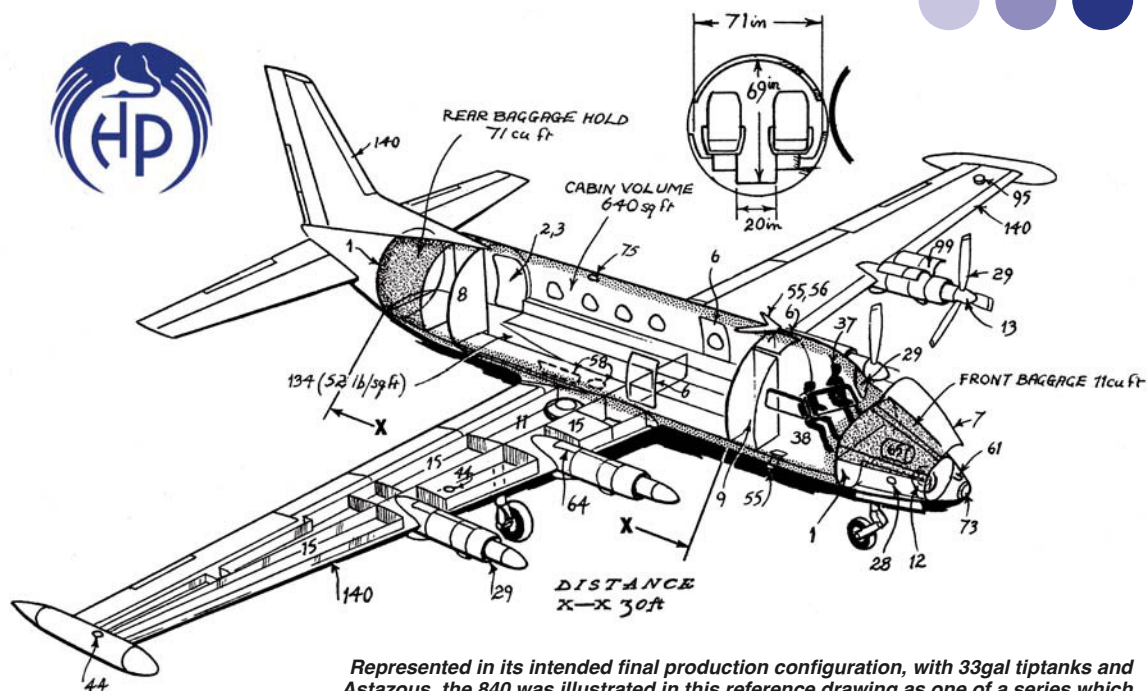
The first aircraft received a full Certificate of Airworthiness on September 27, 1963, at which

point it took up its unconditional registration, F-BJSH, and it stayed in operation with Potez until July 1968, when it was withdrawn from use at Toulouse.

A sales effort got under way but the obvious customer, Air France, expressed little interest in buying the 840. The French Government VIP Flight also failed to finalise a promised order for ten aircraft. Potez discussed the aircraft with Nagasaki Airways (Oriental Air Bridge since 2001) for use on domestic Japanese routes and Ansett-ANA in Australia, but neither airline placed an order. A single executive version was ordered by J.C. Bamford Excavators (JCB) for delivery at the end of 1964 to replace its de Havilland Dove, but this was never delivered.

For Potez the North American market was the main target, so an agency deal was struck with Chicago-based Turbo Flight Inc for marketing and sale of the aircraft. The intention was that Turbo Flight would take delivery of 120 aircraft over a five-year period, starting with an initial batch of 25. A key potential customer was Allegheny Airlines (see David H. Stringer's two-part series on the USA's local service airlines in issues 3 and 4 of *TAH*). Encouraged by this, Potez geared up its Argenteuil and Toulouse plants for production of two aircraft a month and embarked on a new factory at Baldonnel near Dublin, Ireland, using Irish government investment grants, which was opened by Henry Potez on January 16, 1963.

A few days after it received its airworthiness approval on September 22, 1962, the second 840,



*Represented in its intended final production configuration, with 33gal tiptanks and Astazous, the 840 was illustrated in this reference drawing as one of a series which used a common key, hence the non-sequential numbering system in the key below.*

now registered F-BJSU, was delivered to the USA. It was re-registered N840HP and used for flight demonstrations to interested parties. Perhaps unsurprisingly, the Americans were somewhat wary of the quirky French engines, particularly as they were new and untried in service, so Potez agreed that the aircraft would also be offered as the Potez 841 with 580 e.s.h.p. United Aircraft of Canada Ltd (Pratt & Whitney Canada) PT6A-6 turboprops. It was thought that the Potez 840 was underpowered anyway, so further versions with 640 e.s.h.p. PT6A-20s and 750 e.s.h.p. PT6A-22s were also envisaged. Consequently, the next two aircraft, which were the first production examples, were built as Potez 841s with PT6A-22 engines.

## An uphill struggle

By the time the first two Potez 841s had been completed, the deal with Turbo Flight had collapsed and the aircraft went via a German distributor, Aero Dienst GmbH, to corporate customers. The first of these, F-WLKR (c/n 1), made its maiden flight on December 22, 1964, painted in Aero Dienst titles. Nine months of testing took place to approve the new engine specification and it received its certificate of airworthiness on September 29, 1965.

It incorporated some minor modifications, including small 33gal wingtip tanks, and was delivered to Aero Dienst as D-CAER, to be used as a demonstrator. Between 1965 and 1971 it flew around 450hr a year but was sold to German company Kurfiss Aviation in 1973. Kurfiss sold it

### Cutaway key

1 Pressure bulkheads	38 First Officer
2 Passenger door	44 Gravity fuel filler
3 Crew door	55 VHF radio equipment
6 Emergency window or hatch	56 VOR radio equipment
7 Cargo doors	58 ADF equipment
8 Fixed toilet	61 ILS equipment
9 Electronics equipment	64 Hydraulic equipment
11 Main undercarriage well	65 Air-conditioning equipment
12 Nosewheel well	73 Taxying lamp
13 Reverse-pitch propellers	75 Anti-collision beacon
15 Integral fuel tanks	95 Compass detector unit
28 Intake to air conditioning	99 Engine access
29 Electrical de-icing	134 Floor loading (52lb/ft <sup>2</sup> min)
37 Captain	140 Hot-air de-icing

on, initially, to Unimat (as F-BVPZ), but this sale was not completed and the aircraft was painted up as N62271 for an American buyer — but, again, this sale was also not completed. The aircraft ended up at Toulouse where it was withdrawn from use and sold for scrap to a local dealer in 1976.

In March 1966 the second Potez 841 (D-CHEF, c/n 2) went to the large department store company Hertie Waren und Kaufhaus, as an executive aircraft before passing on to Bremen-based Bruno Hoffman in 1972. He sold it to Alfred Ostermann who had a charter operation named Fredair, which used it in 1974 for a few





**ABOVE** The first Potez 841, F-WLKR, fitted with four PT6A-22 turboprops at Toulouse-Blagnac in January 1965, a few weeks after its first flight on December 22. The tiptanks have been added and the aircraft is in the bare metal, pale blue and white colour scheme of German distributor Aero Dienst, with which it was re-registered D-CAER.

flights. It was then sold to the USA as N3430L and ferried across the Atlantic via Montreal to Kansas City in October, 1975. Not long afterwards, the engines were removed and, in May 1976, it was moved from Kansas City Downtown Airport to a local scrapyard.

Following the end of the American marketing arrangement, the American-based 840 demonstrator was returned to the factory in November 1964, where it was re-registered F-BMCY. Potez negotiated a deal for it to be sold to Air Paris in 1973 for charter work and the aircraft was also subsequently used for communications by Sud Aviation. As with other Potez 840s, notably D-CAER, it was prone to undercarriage problems and suffered a collapse on landing at Filton in 1970, but it was repaired and eventually went to the Paris Flying Club in July 1978.

It finally met its end on March 29, 1981, while

on a flight from Paris to Shetland, flown by two Parisian dentists. They were unable to lower the undercarriage before landing at Sumburgh and elected to undertake a wheels-up landing. This was successful but the aircraft was damaged by the fire section when it moved the aircraft off the runway and, after some months of indecision, the insurance company opted to write the aircraft off. The engines were removed and trucked back to France and for more than two decades the wreck lay forgotten on the Sumburgh fire dump. Then, in 2006, local enthusiast Duncan Feather decided to salvage F-BMCY. He moved the wings and fuselage to his home at North Roe, where it remains today.

Potez built two further examples, designated Potez 842, fitted with uprated Astazou XII engines rated at 640 e.s.h.p. The first of these was F-BNAN (c/n 3), which was ordered by the French Ministry of Public Works & Transport,

**The first of the two Potez 842s built with uprated Astazou XII engines, F-BNAN, which went on to serve with French training organisation SFA during 1966–76, after which it was acquired by the Musée de l'Air at Le Bourget, where it still resides.**

MIKE HOOKS





*Another of Jean Dieuzaide's atmospheric promotional photographs of the first prototype Potez 840. The company had bet the farm on the graceful transport, but in the crowded civil aircraft market of the 1960s orders were not forthcoming and the remnants of Potez were absorbed into Sud Aviation in 1967.*

TAH ARCHIVE

but which was actually delivered in July 1966, via the SGACC (Civil Aviation Secretariat), to the French aviation training organisation SFA (*Service de la Formation Aéronautique*). It was used by SFA until December 1976, when it was withdrawn from use and handed over to the *Musée de l'Air* at Le Bourget.

The other Potez 842 (c/n 4) was ordered by the Moroccan *Ministère de la Défense Nationale* and received its airworthiness certificate on October 28, 1966, being registered CN-MBC. It was later given the military markings CN-ALL and was sold to Euroworld in California in May 1978 as N9878A. However, it is probable that it was never delivered to the USA and remained derelict at Rabat in Morocco.

### The end of the line

The lack of success of the Potez 840 programme had a profound effect on the *Établissements Potez*. Commercial sales were minimal and the development had swallowed large amounts of capital. The company had produced just two prototype 840s, two production 841s and a pair of 842s, together with two static test airframes (c/ns 02 and 03). It had intended to offer a smaller twin-engine version, designated Potez 890, with nine passenger seats, but this did not materialise. Other Potez products such as the 105E light piston engine had seen limited success, powering a few Jodel DR1051s, and Magister developments such as the Potez-Heinkel CM.191 business jet were dead ends. Consequently, in 1967, the Potez Group collapsed and its remaining assets were absorbed into Sud Aviation, which had little interest in trying to breathe new life into the stylish but stillborn Potez 840.



## Potez 840, 841 & 842 data

### Powerplant

**840** 4 x 530 e.s.h.p. Turboméca Astazou II (first prototype) or 600 e.s.h.p. Astazou XII turboprops

**841** 4 x 588 e.s.h.p. Pratt & Whitney PT6A-22 turboprops

**842** 4 x 640 e.s.h.p. Turboméca Astazou XII turboprops

### Dimensions

Span		
(minus tiptanks)	64ft 4in	(19.6m)
Length	52ft 1in	(15.89m)
Height	17ft 1in	(5.19m)
Wing area	377ft <sup>2</sup>	(35m <sup>2</sup> )

### Weights

Empty		
840	10,916lb	(4,965kg)
841 & 842	11,970lb	(5,430kg)
Maximum		
840	18,700lb	(8,500kg)
841 & 842	19,620lb	(8,900kg)
Max payload		
840	4,764lb	(2,160kg)
841 & 842	5,511lb	(2,500kg)

### Performance

Max speed		
840	338 m.p.h.	(541km/h)
841 & 842	310 m.p.h.	(500km/h)
Max cruise		
840	326 m.p.h.	(522km/h)
841	292 m.p.h.	(470km/h)
842	310 m.p.h.	(500km/h)
Stall speed		
840	88 m.p.h.	(142km/h)
841 & 842	84 m.p.h.	(135km/h)
Rate of climb		
840	2,165ft/min	(660m/min)
841	1,810ft/min	(552m/min)
842	2,065ft/min	(630m/min)
Range with max fuel		
840	680 miles	(1,480km)
841 & 842	1,060 miles	(1,700km)






# HUNTING The Lion of Afrika

**26 SQN RFC IN AFRICA, 1915—18**



Formed in late 1915, No 26 (South Africa) Sqn RFC was soon on its way to East Africa to help contain German General Paul von Lettow-Vorbeck and his formidable force of Askari soldiers. **GUY ELLIS** details the unit's trials and tribulations in East African skies

 ON JULY 9, 1915, the Kaiser's forces in German South-West Africa (now Namibia) surrendered at Otavifontein. No longer required, the Allies' fledgling South African Aviation Corps was disbanded. Those personnel that volunteered to continue service were shipped to England, where they were banded together at Netheravon, Wiltshire, on October 8, 1915, to form No 26 (South Africa) Sqn of the Royal Flying Corps (RFC). The unit's origins are clearly revealed in its badge, in which the head of a springbok forms the centre-piece, with the squadron's motto in Afrikaans: "*N Wagter in die Lug*" (a watcher in the sky).

Barely three months later, on December 23, 1915, the unit was posted to British East Africa

(now Kenya), tasked with assisting British ground forces against a formidable opponent, German Colonel Paul Emil von Lettow-Vorbeck, who would come to be known in Germany as "*Der Löwe von Afrika*" — the Lion of Africa.

Arriving at Mombasa on January 31, 1916, 26 Sqn was quickly established at Mbuyuni. Equipped with Royal Aircraft Factory (RAF) B.E.2cs and a few Henry Farman all-steel machines previously used in South-West Africa, the unit began operations on February 1. It was not plain sailing. The B.E.2cs arrived without propellers, so the fitters had to jury-rig standard RAF props, and in doing so put severe strain on the machines' Renault engines. The Farmans were in very poor condition with warped wings and rotten linen coverings.

**OPPOSITE TOP** "*The Lion of Africa*" — General Paul Emil von Lettow-Vorbeck in 1913. The General was the commander of the Imperial German Army in the German East Africa campaign in which he led a large force of native enlisted "*Askari*" soldiers.

DEUTSCHES BUNDESARCHIV

**MAIN PICTURE** After being formed at Netheravon in October 1915, No 26 Sqn (badge at RIGHT) was sent to East Africa with a complement of Farman F.27s and Royal Aircraft Factory B.E.2cs, examples of both of which are seen here serving with No 31 Sqn at Risalpur, India.

PHILIP JARRETT COLLECTION







*One of a number of photographs taken by Capt Henry C. Brocklehurst of No 26 Sqn while in East Africa. Although it was rapidly becoming obsolete by 1916, the B.E.2c proved to be a reliable workhorse for 26 Sqn, its inherent stability making it a steady platform for its photographic reconnaissance role.*

The philosophy of Colonel von Lettow-Vorbeck, meanwhile, was simple; by using hit-and-run tactics he could tie down a huge number of British troops over in East Africa and thus prevent them from joining the fighting in Europe. Prussian officers, contrary to the popular stereotype of rigid, non-thinking disciplinarians, were in fact extremely flexible individualists, and von Lettow-Vorbeck was a prime example.

In February 1916 a new Allied commander arrived in East Africa to try his luck against the Germans: Jan Smuts, the former Boer War general. He added new impetus to the British effort, immediately going on the offensive. His troops were a mixture of men of races from all over the Empire.

The air contingent initially began with scouting sorties but did engage later in some rudimentary bombing. These sorties were undertaken in conjunction with Royal Naval Air Service (RNAS) aircraft, and their combined efforts forced

the Germans to retreat from the Kilimanjaro area.

The Allied invasion of German East Africa (now Burundi, Rwanda and Tanzania) was conducted with two forces. The main operation, commanded by Smuts, proceeded along the Pangani River (now in north-eastern Tanzania). It was in support of this force that No 26 Sqn operated.

### **FIGHTING THE ASKARIS**

Despite his eagerness to get to grips with what at times must have seemed a phantom enemy, Smuts met with little success. His campaign in East Africa was a series of frustrating attempts to surround von Lettow-Vorbeck's main force or to bring him to fight a decisive battle. Smuts never succeeded. Each time they tried, the British were convinced that they would bring von Lettow-Vorbeck to bay, only for the German to elude them. He always retreated in the face of overwhelming force, but not before it was necessary, and it was never easy

*Askari soldiers in East Africa in 1917. These were natives who were recruited into the Schütztruppe (German Colonial Army) to serve alongside European officers and NCOs. They were harshly disciplined but highly paid and trained to an exceptional level.*

DEUTSCHES BUNDESARCHIV





**LEFT** Another of Capt Brocklehurst's photographs shows a group of 26 Sqn members off-duty outside the tent at one of the unit's primitive airfields. The unit was made up of a mixture of British and South African personnel, most of the latter having previously served with the South African Aviation Corps.

**BELOW** The rudimentary conditions in which 26 Sqn had to operate in East Africa is evident in this photograph of a B.E.2c at the ready beside a tent on an unidentified airfield. The unit moved regularly, operating from more than 15 bases between January 1916 and January 1918.

to assemble the required force at the vital point. Smuts and the commanders-in-chief who followed him captured territory, but none succeeded in defeating the wily German.

Throughout the war in Africa the British underestimated the Germans and their black troops, known as Askaris, who had been well-trained by their German officers. Moreover, the Askaris were familiar with the terrain and were ideally suited for guerrilla warfare. Chasing von Lettow-Vorbeck proved to be an agony of endurance for the Allied forces. Disease took a heavier toll than the enemy, and the conditions under which the troops marched and fought took the men to the limits of human endurance. These frustrations were not limited to the ground forces alone; 26 Sqn also found the operating environment difficult. Throughout April and into the middle of May 1916, rain curtailed operations.

The topography was mountainous, with peaks

rising to 19,000ft (6,000m). Dense bush offered no safe haven for airfields, let alone emergency landings. As a consequence the squadron's base could not always keep up with the main forces. The resulting longer flying times fatigued the pilots and added to the wear and tear on the fragile aircraft. The advent of monsoon conditions from May to October meant that a low cloudbase was experienced in the morning and typically only lifted to 3,000ft (90m) during the day. Naturally the flying conditions were very bumpy.

The mixed South African and British personnel of the unit were living as roughly as the troops. They lived a hard life of heat, wild animals, old equipment and very rough clearings acting as airstrips. Malaria was a continual problem and medicine was scarce; many of the flying accidents were probably a result of fever. The squadron kept on flying every day, from dawn to dusk, monitoring the German retreat. The prime object







**LEFT** Probably B.E.2c 4349, in which Capt Brocklehurst suffered engine failure at 600ft (180m) and had to make a forced landing in thick bush 3½ miles from base on September 5, 1917.

**BELOW** A pair of B.E.2cs of 26 Sqn at Njombe, now part of Tanzania. One of the unit's observers was Leo Walmsley, who went on to become a well-known writer, and who wrote of his experiences of First World War East Africa in his 1944 memoir *So Many Loves* (Collins).

was photographic reconnaissance, but when the photographic plates were unpacked they were found to be ruined as they had not been prepared for tropical shipment, so Lt-Cdr Cull's Kodak fold-up camera was used initially.

## INTO ACTION

Aircraft were used for scouting and to "bomb" the enemy on the few occasions that the pilots could find them. There was a claim of success in the destruction of a locomotive and its crew, while the well-known South African pilot, Capt William W. Carey-Thomas, made and dropped bombs made from artillery shells with fins cut from tins. On the whole the bombing was so ineffective that eventually the Germans did not even bother to step off the road when an aeroplane appeared.

Much of the unit's work went unappreciated, as traditional infantry officers could not accept the roughly drawn maps highlighting German positions, or there were difficulties in dropping maps to ground personnel. Communication was a serious problem.

The squadron arrived at Morogoro in the southern highlands on August 31, 1916. Throughout

this period flights were made daily and wherever possible the enemy was harassed. In September disposition changes were made. Squadron HQ and "A" Flight remained at Morogoro, "B" Flight relocated to Tulo and "C" Flight moved to Dar es-Salaam to take part in coastal operations. In December "C" Flight moved again to Liwa to work with the British Army's 1st Division. Reconnaissance and bombing formed the major part of the work, although some artillery range work was undertaken as well.

Maintaining the airworthiness of the machines was extremely difficult, and much ingenuity was shown. The Renaults' magnetos were a major source of engine failures as they broke up in the heat. The engineers ended up modifying Bosch magnetoes in the railway workshops in Nairobi, while others were machined in the railway workshops in South Africa. Ford Model T inner tubes were used at one stage as substitutes for those normally fitted to the B.E.2cs.

In January 1917, Mohoro, situated on the Rufiji delta, was occupied by the British 1st Division, with pushes being made in the west and east against German forces. On January 28 heavy rain

PHILIP JARRETT COLLECTION





began to fall, heralding the beginning of one of the region's wettest seasons in history. Flying was all but impossible and 26 Sqn could do little for the campaign. The Farmans had been withdrawn in January, leaving only B.E.2cs.

### THE CAMPAIGN ENDS

Once the rains had ceased, operations commenced in earnest in June. This campaign terminated with the surrender of *Hauptmann* Theodor Tafel's 1,000-strong detachment and the retreat of von Lettow-Vorbeck into Portuguese Mozambique. It was a long and hard campaign of skirmishes and marches across a wide inhospitable area.

Meanwhile, 26 Sqn's "C" Flight operated from Kilwa until August and then moved to Mssindi where it was joined by "B" Flight. The latter had been at Tulo working with British forces in the north-west corner of the country. By August an Aircraft Park and HQ had been established at Dar es-Salaam. In early October both flights moved to Nahungu and a month later joined the RNAS (Royal Naval Air Service).

Squadron personnel returned to England in July 1918 and the unit was disbanded at Blandford Camp the same month. It was reformed as an Army Co-operation squadron at Catterick on October 11, 1927, with Armstrong Whitworth Atlases, and served in this role until after the end of the Second World War, being disbanded at Lübeck on April 1, 1946. On the same day, No 41 Sqn at Wunstorf was renumbered as 26 Sqn, the unit flying Supermarine Spitfires and Hawker Tempests until it was re-equipped with de Havilland Vampires in April 1949. After numerous disbandments and reformations over the next 25 years, the unit was finally disbanded on April 1, 1976, at Wyton, where it had served as a communications squadron.

Undeclared, von Lettow-Vorbeck surrendered on November 25, 1918. Allied officers treated him

### "THE B.E.2c IS MY BUS . . ."

ALTHOUGH INVALUABLE at the beginning of the First World War, the Royal Aircraft Factory B.E.2c (an example of which, 4548, is seen **ABOVE**) quickly became obsolete. Its redundancy is highlighted in the following parody on the 23rd Psalm, created by those who flew it:

*The B.E.2c is my bus; therefore shall I want.  
He maketh me to come down in green pastures,  
He leadeth me where I wish not to go.  
He maketh me to be sick;  
He leadeth me astray on all cross-country flights.  
Yea, although I fly o'er no-man's-land,  
Where mine enemies would compass me about,  
I fear much evil, for thou art with me,  
Thy joystick and thy prop discomfit me.  
Thou prepareth a crash for me in the presence of  
mine enemies.  
Thy RAF anointeth my hair with oil, thy tank  
leaketh badly.  
Surely to goodness thou shalt not follow me all the  
days of my life,  
Else I shall dwell in the House of Colney Hatch  
for ever.*

with great respect, and, as the war had been fought in a gentlemanly fashion throughout, he was not imprisoned, but given the use of a car and invited to dinner by the South African General Jacob van Deventer.

Returning to Germany a hero, von Lettow-Vorbeck remained in the military for another ten years, after which he entered politics and served in the Reichstag. He and Smuts formed a lasting friendship. After World War Two, in which he opposed the Nazi Party and refused its offer of a post as ambassador, he lived in poverty for many years. Smuts, on hearing of the plight of his former enemy, sent him regular food parcels. Aged 93, the "Lion of Africa" died in Hamburg on March 9, 1964.







**LEFT** *Lieutenant-Commander Eric M. "Winkle" Brown in Royal Navy tropical service dress uniform in the early 1950s, around the time he was attached to Flight Test Division at the US Naval Air Test Center at Patuxent River, Maryland.*

**BELOW** *Continuing the Grumman tradition, the F9F Panther was a brawny design which somehow retained rather elegant lines. The prototype XF9F-2 made its maiden flight on November 27, 1947, the type going on to be produced in several variants. This example is an F9F-2 painted in a special test colour scheme that was not adopted as standard for US Navy service. Note the distinctive split perforated airbrake forward of the wing.*

PHILIP JARRETT COLLECTION





# big cat DIARY

*In a newly-reissued and fully revised edition of his classic book Wings of the Navy, **CAPT ERIC M. "WINKLE" BROWN** introduces a number of new accounts of naval types that he flew in the course of his illustrious career, including the Grumman Panther — which, despite its muscular appearance, offered surprisingly lacklustre performance*

THE FIRST GRUMMAN F9F-5 Panther was delivered to the US Naval Air Test Center (NATC) at Patuxent River, Maryland, in January 1951, and I arrived there eight months later as the resident British naval test pilot attached to Flight Test Division. My first assignment was as Project Officer on the F9F-5, which was already in squadron service on a limited operational release, so my job was to fill in the gaps necessary to bring it up to full release status.

## Portly but elegant

The first thing that struck me about the Panther was its sheer size by British standards. Although a somewhat portly aeroplane in the Grumman tradition, it had a certain appealing elegance. It housed a lot of fuel, carrying 1,003 US gal (3,797lit), of which 240 US gal (908lit) were in the wingtip tanks, from which the fuel could be

jettisoned in 1min at an airspeed of 340kt. A pressure-operated water-injection system was fitted, utilising a mixture of three parts distilled water with two parts alcohol, thus boosting the engine thrust to 7,000lb (3,175kg). Armament consisted of four 20mm nose cannon and six 5in (127mm) rockets plus two 1,000lb (454kg) bombs which could be carried externally.

The Panther was a midwing design, with the engine buried in the fuselage and having an unusually short tailpipe below and forward of the tail unit. Both elevators had spring tabs with additional pilot-controlled trim tabs. There were also pilot-operated trim tabs on the ailerons and rudder. The ailerons were hydraulically powerboosted at a 37:1 ratio and had manual reversion in the event of hydraulic failure.

The flaps consisted of two sections, one on the wing itself and the other on the centre section and underside of the fuselage. There was a TAKE



*MiG Alley cat — F9F-5 BuNo 125228 displays its beefy naval pedigree. The Panther was built to be robust and, although it was outclassed by the Soviet MiG-15 as a fighter in Korea, it nevertheless acquitted itself well as a fighter-bomber during the conflict.*



OFF position, in which the outboard slotted flaps lowered 40° and the inboard split flaps 45°, and a LAND position with the outboard flaps at 40° and the inboard flaps at 19°. The lower setting for landing prevented the flap sections on the underside of the fuselage striking arrester wires or contacting the deck during deck landing. That, however, proved to be a very rare occurrence, and the use of the LAND position was eventually discontinued. A wing leading edge “droop snoot” operated with the flaps and deflected to 19°.

#### The office

The variable-position speed brakes consisted of two perforated panels under the fuselage centre section forward of the inboard flaps. Like the latter they were in danger of contacting the deck

if fully lowered (75°) for landing. They were not very effective in decelerating the aircraft at speeds below 250kt (463km/h).

A hydraulic tailskid was interconnected mechanically with the arrester hook and also with the undercarriage. It could also be actuated by throttle movement, being retracted when the throttle was opened fully and lowered when the throttle was retarded to 90 per cent r.p.m. The actuating control on the arrester hook overrode the other two control switches when the hook was lowered. The arrester hook itself had a double movement action. It extended mechanically to a horizontal or trail position and then fell vertically. The pilot could retract it hydraulically to the trail position.

On my first flight in F9F-5 BuNo 125082, on September 27, 1951, I found the cockpit roomy,

*This is the Panther the author flew at the NATC in September 1951, F9F-5 BuNo 125082, fitted with a nose-mounted probe for trials. The F9F-5 was a re-engined and enlarged variant, with a stretched fuselage and taller fin.*



*The US Marines also operated the Panther, two units — VMF-115 and VMF-311 — flying the type in Korea. This pair from VMF-115 roar into the air at Roosevelt Roads in Puerto Rico. Note the deflected flaps and lowered leading-edge “droop snoots”.*



well laid out and with a good all-round view. Start-up and taxiing were easy, although it took a fair amount of power to get this baby rolling. The take-off was rather unimpressive and the aircraft gave the feeling of being rather underpowered. The nosewheel lift-off speed was 89kt (165km/h), with unstick at 105kt (194km/h) and thereafter the Panther accelerated rather ponderously to the initial climbing speed of 320kt (593km/h). The climb took a little over 7min to 30,000ft (9,150m) and just over 14min to 40,000ft (12,200m), but only if the maximum jetpipe temperature (JPT) was allowed to overshoot above 35,000ft (10,670m).

Over a series of handling and performance test flights I concluded that the Panther was essentially lacking in the indispensable requirements of a fighter; namely gun-platform stability, manoeuvrability and harmony of control. In brief, it snaked badly with a short-period small-amplitude oscillation; the stick force per g was too high — 8½lb/g (3.9kg/g) at 450kt (833km/h) at 10,000ft (3,050m) and 14lb/g (6.4kg/g) at 30,000ft (9,150m) (both values for mid-c.g.) — and the harmony of control was spoilt by the combination of heavy elevators and light ailerons.

Moreover, the lateral control system was poor in that insufficient aileron centring and neutral static lateral control force stability made instrument flying difficult. There was provision for artificial spring-feel, but the spring was not fitted to this aircraft. The maximum rate of roll was 163°/sec at 335kt (620km/h), which was slightly below the accepted modern fighter standards of the day.

With the hydraulic power-boost off there was unpleasant lateral stickplay near the neutral stick position. This, added to the poor rate of roll and high stick-force in that condition, made it unsatisfactory for deck landing in the event of a boost failure.

### Far from feline agility

The Panther's high-speed characteristics were marred by longitudinal static control force instability, and also a marked loss in elevator effectiveness and undesirable nose-down pitch with speedbrake operation. There was also slight buffeting and lateral lurching above Mach 0.85. The limiting safe Mach number of the aircraft was Mach 0.88.

The low-speed characteristics were satisfactory except for a lack of sufficient aerodynamic stall warning, and rather sensitive speed control during a deck-landing approach owing to the weakly positive static longitudinal stability, particularly at aft centre of gravity. Neither of these defects was serious and I found it an easy aeroplane to deckland. View on the approach at 113kt (209km/h) was very good, but that was a high entry speed for contemporary arrestor gear.

At that stage the F9F-5 was fitted with small wing centre-section stall fences which were intended to control the spanwise airflow and thus reduce the rather high landing speed. The fences reduced the stalling speed in the landing configuration by some 3½kt (6.5km/h) to 98½kt (182km/h), but they had no effect on the clean stalling speed of 131kt (243km/h). Furthermore, they had an adverse effect on stall warning, so





when adopting the stall fences as standard on production Panthers the US Navy also introduced a stall-warning stick-shaker.

### Panther meets *Perseus*

For shipboard operations the wings folded upwards immediately outboard of the air intakes, reducing the overall span to 23ft 9in (7.2m). Catapult and arresting trials were also undertaken at Patuxent River and the F9F-5 was cleared to be catapulted at gross weights up to 21,500lb (9,752kg) and arrested up to 14,200lb (6,441kg). I was frequently launched from the H4B pneu-

matic-hydraulic catapult with various combinations of stores beneath the Panther.

The most exciting event in my project calendar, however, was the demonstration of the British BXS1 steam catapult aboard *HMS Perseus*, which arrived in American waters in January 1952. I flew F9F-2 BuNo 123018 (originally an F9F-3) up to the US Navy base at Mustin Field, Philadelphia, on the morning of February 5, then taxied it from the airfield into the adjacent Navy Yard and right alongside *Perseus*, which was berthed there. The Panther was hoisted aboard by crane and I made the first launch that afternoon, with the carrier

**TOP** The wings of F9F-2 BuNo 127174 of VF-111 fold following its return to USS Valley Forge after a bombing mission over Korea during the carrier's third of four cruises in South-east Asian waters during the conflict.

**BELOW** The Colossus-class aircraft carrier *HMS Perseus*, which in 1950 was fitted with the experimental BXS1 steam catapult. It arrived at Philadelphia in January 1952 and completed 127 launches by British and American aircraft before returning to the UK that March. It was converted to a ferry carrier and was scrapped in May 1958.

TAH ARCHIVE





Deck crew members aboard USS Boxer work on a pair of F9F-2s of VF-721 to prepare them for an afternoon bombing mission over North Korea in the autumn of 1951. The Panther was Grumman's first jet-powered aircraft, and earned the distinction of being the first US Navy aircraft to shoot down a MiG-15.


still alongside and a 5kt (9km/h) tailwind blowing down the catapult.

There were many sceptics around when the captain of *Perseus* ordered the launch to be made, but he shrewdly realised that there could be no more impressive a demonstration of the catapult than in such conditions. The acceleration of 4.3g was so smooth that I had difficulty accepting that I had soared away with an endspeed of 126kt (233km/h). I landed back at Mustin and next day repeated the performance twice, with 8kt (15km/h) and 6kt (11km/h) tailwinds. The catapult gave 4.2g and a 127kt (235km/h) end-speed on the first launch and 4.5g and 132kt (244km/h) on the second. *Perseus* put to sea a few days later, and on February 12 I was launched in flat-calm sea conditions in Chesapeake Bay with a 7kt wind. The F9F-2 carried a full fuel load and was shot off at 4.18g with an endspeed of 122kt (226km/h), which certainly sped me on my way to Norfolk Naval Air Station in Virginia.

The F9F-5 had a maximum speed of 526kt (974km/h) true airspeed (TAS) at sea level, a service ceiling of 42,000ft (12,800m), and a range of 1,255 miles (2,325km) at 405kt (750km/h) TAS at 40,000ft (12,200m). In Korea, where low-level operations were the order of the day, the sea-level turn of speed and useful endurance were to stand the Panther in good stead. It had limited success in the fighter role but performed creditably as a ground-attack fighter-bomber.

### Too much too soon?

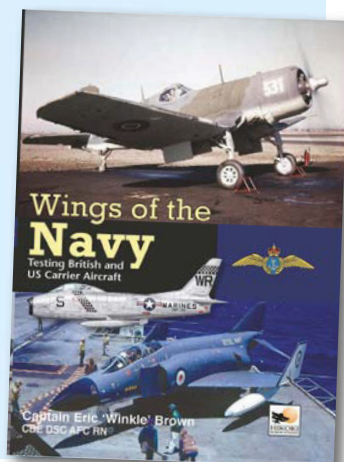
In my view the Panther had been rushed into production and service, and committed to combat over Korea, at too early a stage in its development

career, and some of its shortcomings should have been ironed out before it appeared on US Navy carrier decks. It fell rather short of being a great naval fighter, and if it was something of a mediocrity it is perhaps charitable to assume that its indifferent capability was primarily owing to the pressure under which it was developed by Grumman, combined with the company's inexperience in jet fighter design at the time. 

### WINGS OF THE NAVY by Capt Eric "Winkle" Brown

THIS LATEST EDITION of Capt Eric "Winkle" Brown's best-selling *Wings of the Navy*, now with the subtitle *Testing British and US Carrier Aircraft*, is published by Crécy Publishing (ISBN 978-1-90210-932-9, RRP £34.95) and has been revised and expanded to include a number of new chapters in which this most distinguished of British airmen describes his experiences of America's naval aircraft as well as those used by the Royal Navy. The book includes 30 aircraft types and more than 300 photographs, diagrams and colour profiles.

■ For more info visit [www.crecy.co.uk](http://www.crecy.co.uk)







# Armchair AVIATION

*We take a look at what's available for the aviation history enthusiast in the world of books and other literature, from brand-new hot-off-the-press publications to reissued classics*

## **Speedbird: The Complete History of BOAC**

By Robin Higham; I.B. Tauris & Co Ltd, 6 Salem Road, London W2 4BU; 6½in x 9½in (158 x 240mm); hardback; 491 pages, illustrated; £30. ISBN 978-1-780764-62-7

THIS REMARKABLE 15-chapter book owes its origins to a handwritten note from Sir Basil Smallpeice, then chairman of state-owned BOAC, in 1960. To mark 25 years of the airline he requested a history of BOAC from Robin Higham, a former wartime RAFVR pilot and later Emeritus Professor of History at Kansas State University.

Higham was installed in a room at BOAC's Heathrow headquarters, nicknamed "The Kremlin". His window, for inspiration while examining the corporation's minutes and archives, overlooked the gleaming blue-and-gold Boeing 707s undergoing servicing. Higham's researches into the BOAC story — from the airline's inception in the darkest days of 1940 through to the Boeing 747 era — was very thorough; perhaps *too* thorough for BOAC sensitivities. In 1964 the manuscript was locked away until an "appropriate" time to publish could be established.

Ten years later Higham carried the BOAC story forward until 1974 but, with Concorde's controversial procurement then foremost, the updated — but carefully lawyered — BOAC history remained under British Airways wraps until 2010.

*Speedbird* presents a fascinating insight into how a UK state-owned corporation was expected to function, having a triumvirate of bosses: the Government, the Treasury and the BOAC board. The British Overseas Airways Corporation arose out of a merger between Imperial and British Airways in 1936. Higham



opens with BOAC's part in World War Two; the Corporation's war was an honourable one performed with a varied fleet of landplanes and flying-boats, the latter suffering heavy losses at the hands of the Japanese as BOAC's partner, Qantas Empire Airways, fought to maintain communications across South-east Asia.

Post-war chapters reveal that BOAC was let down by HM Treasury's short-sightedness. Higham argues that BOAC, with only a small fleet of sanctioned Lockheed Constellations, could, with a combined but larger fleet of Constellations and Avro Yorks,

have quickly returned a dollar profit and avoided the Avro Tudor fiasco, thus achieving the desired two-type fleet until the de Havilland Comet and Bristol Britannia jet/turbine era of the 1950s.

Turning the pages of *Speedbird* it is abundantly clear — in the BOAC board's view — that buying post-war British airliners was disastrous, but the Corporation was charged with not only making an operating profit but also to "shop-window" the UK's newest "world-beating" airliners. This strategy was to cost BOAC (and the British taxpayer) dear, with millions set aside to prop up the home industry and prevent it from going bust.

This reviewer, a staunch supporter of British aircraft, now feels that, with two notable exceptions, the UK's aircraft industry was not commercially up to the job of developing and building large airliners quickly enough. In contrast, the "off-the-shelf-in-two-years" Boeing 707, the reader learns, "was a licence to print your own money" — a remark made by BOAC's chief pilot. The sad saga of the Vickers VC10/Super VC10 order is well documented. This was an airliner BOAC never wanted, yet it was loved

by its crews and passengers alike; noise restrictions and heavy fuel costs killed it off eventually.

BOAC had its critics, *The Aeroplane* for one, and some argue that the airline was simply a tool of the Foreign Office, ferrying royalty, politicians and diplomats around the rapidly-shrinking British Empire. There is much else in Higham's *Speedbird*, encompassing politics, boardroom tensions, traffic rights, BOAC's associate companies, relations with the UK independents and Heathrow industrial relations. Higham states that when BOAC pilots went on strike, the public was aghast — "pilots are gentlemen, gentlemen do not go on strike".

There is a comprehensive biography and a full listing of the 77 aircraft types that served BOAC, including Focke-Wulf Condor G-AGAY. Such an identity raised but few eyebrows in 1940.

Adjust your seat pitch and read; this book will take good care of you.

ROGER CARVELL

## Austro-Hungarian Albatros Aces of World War 1

By Paolo Varriale; Osprey Publishing, Midland House, West Way, Botley, Oxford OX2 0PH; 7½in x 9½in (184mm x 248mm); softback; 96 pages, illustrated; £13.99. ISBN 978-1-84908-747-6

NUMBER 110 in the publisher's popular *Aircraft of the Aces* series, this volume will introduce many enthusiasts and modellers interested in First World War aviation to an aspect they might have ignored hitherto. The German Albatros D II and D III entered service with the Austro-Hungarian *Fliegercompagnien* from May 1917, becoming the mounts of a good number of aces. In this compact volume the author describes the fighters' introduction into service and use, their work on the Russian, Rumanian, Albanian



and Italian fronts, recounts the deeds of the types' foremost exponents and finally relates what happened to some of the pilots and aircraft after the end of the war.

Colour artwork side and plan elevations form an important part of these volumes, and in this case there are ten pages of them, offering modellers a generous choice. Descriptive captions are provided at the back of the book, where a

list of victory claims may also be found. Monochrome illustrations with informative captions are dispersed throughout the text.

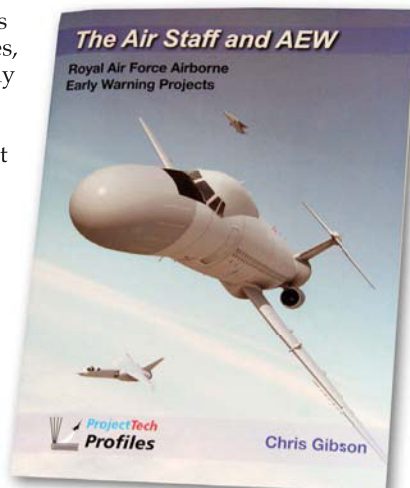
PHILIP JARRETT

## The Air Staff and AEW: Royal Air Force Airborne Early Warning Projects

By Chris Gibson; Project Tech Profiles, Blue Envoy Press, available to order by e-mail from [blue.envoy.services@googlemail.com](mailto:blue.envoy.services@googlemail.com); 8½in x 11in (216mm x 280mm); softback; 48 pages; illustrated; £9.95 + p&p. ISBN 978-0-95619-513-5

THIS LATEST OFFERING from Chris Gibson contains a wealth of material which its slender size belies. The sad story of the UK's faltering attempts to develop a workable airborne early warning (AEW) system is described to the extent that the reader is rendered incredulous at the continuing saga over a period of some 40 years of what the author accurately describes as "a well-known and oft-related tale of hand-me-down radar in old airframes".

During World War Two the testing of a Vickers Wellington bearing a rotating Yagi antenna atop its fuselage gave a hopeful indication that the UK would be at the forefront of developing an airborne early warning system, especially for maritime surveillance. It was declared obsolete within six months, but a modified version was used to provide some airborne cover to help track V1 flying-bombs, including those launched from Heinkel He 111





bombers. The lead held by the UK was soon to be frittered away and development of the rotating antenna was abandoned, only for it to reappear successfully in the USA in the 1960s.

September 1945 saw the first mention of the fore-and-aft scanner system (FASS), which led to the blind alley into which UK airborne radar pursued its illusory future. The outcome of trials was disappointing and, as a result, AEW development ceased for 20 years, reinforced by the Air Defence Working Party in 1954 stating there was no need for it in a missile-based air defence system.

Once studies into AEW had recommenced, the lack of purpose and direction was apparent by the revelation that aircraft manufacturers' proposals involved using almost every type of multi-engined machine as the platform. These proposals were made in response to a succession of Air Staff Requirements (ASRs), followed inevitably by cancellation. FASS radar was *de rigueur* (except for a retracting spherical ventral radome in two proposals by BAC using a single radar) and led to some very ugly aircraft. The comment by HRH Prince of Wales about the extension to the National Gallery being "a monstrous carbuncle on the face of a much-loved and elegant friend" could have applied in many such cases, especially to the excrescences planned for the magnificent VC10, a graphic impression of which is shown on the back cover.

ASR 400 in 1976 led to one of the biggest aircraft procurement débâcles of the 20th Century — the Hawker Siddeley Nimrod AEW.3. It is noteworthy that the author draws attention to the lack of a positive attitude on the part of Fred Mulley, the UK Defence Secretary, shown when he announced in March 1977 the decision to proceed with the project. For the many reasons set out in the book, the replacement of the Avro Shackleton was long overdue and Mulley was left with no alternative but to order the AEW.3. As the story of the AEW.3 has often been told, the author rightly does not spend a disproportionate amount of time going over old arguments, but elicits fresh information and views to expand what is already available.

The author cogently compares the differing approaches of the UK and the USA in their procurement practices. Boeing's EC-137D, the test aircraft for the E-3A, had already flown in February 1972, and the Americans were

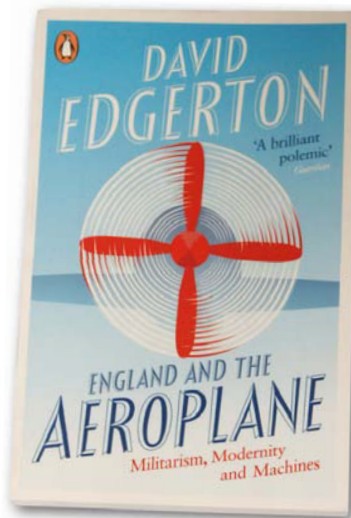
proceeding on the basis of getting the aircraft into service with limited capability and ironing out the bugs in service. On the other hand the RAF, which had long lusted after the E-3, insisted that the Nimrod had fully to meet the more exacting operational requirements of ASR 400 before it would be accepted. This is described as "the undoing of the Nimrod", which was cancelled on December 18, 1986, at a cost to the British taxpayer of £660m. In due course the desires of the Air Staff were met with the ordering of Boeing E-3Ds.

The history and politics of the *débâcle* surrounding the history of AEW procurement from the end of World War Two until the 1990s, and the total ineptitude shown by the Defence Ministry, are well narrated in Chris Gibson's usual incisive manner, but a more comprehensive glossary of terms for those of us who are not *au fait* with the terminology of radar would have been welcome. This book expertly details the near-chaos and confusion existing in early-warning aircraft procurement within the Ministry of Defence which cost the UK dear, not just through the cost of lost production and time wasted in pursuing ill thought-out requirements, but in its reputation as a major aircraft and radar systems producer. Read it and weep!

FRED CROSSKEY

## England and the Aeroplane: Militarism, Modernity and Machines

By David Edgerton; Penguin Random House, 80 Strand, London WC2R 0RL; 5in x 7½in (128mm x 194mm); softback; 272 pages, illustrated; £9.99. ISBN 978-0-14197-516-0



THIS WAS FIRST published two decades ago with the subtitle "An essay on a militant and technological nation". How does it stand up 20 years on, now Penguin has reissued it as a mass-market paperback? On its original release, it hit academia with the force of a blockbuster. Edgerton's punchy polemic was directed at what he saw as myths about the aeroplane's place in British history. As the original subtitle suggested, this is an essay rather than a research monograph. Although it contains, as Edgerton puts it, "a

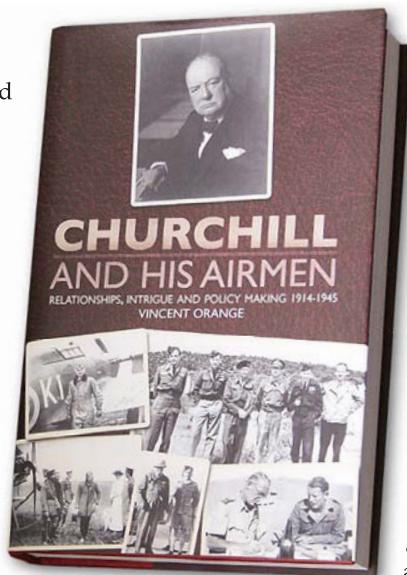
high ratio of assertion to detailed evidence", it holds up well to current scrutiny.

Part of Edgerton's argument was directed at a contemporary strand of history that sought to explain a British national decline in terms of a lack of support for science and technology. Historians such as Corelli Barnett viewed the UK's aviation industry as emblematic of wider industrial failings. Contrary to this influential narrative of weakness and lack of government support, Edgerton argued that this was based on a misinterpretation of the evidence; in fact the British state had long preferred high-technology approaches to war, and as a result had built one of the most powerful aviation industries in the world — arguably *the* most powerful during the inter-war period. Post-war, the Ministry of Aircraft Production was merged into the Ministry of Supply, but continued to direct and fund the aircraft manufacturers.

Although the importance of the state and the military should not be surprising to those who study aviation history, this has often been masked in aviation writing by a focus on particular aircraft types and the companies that built them. Aircraft production is also often seen as a high technology rather than a military technology. As Edgerton notes in a telling aside, guns and tanks are not usually displayed in "pure" science and technology museums, but aircraft and spacecraft are. This view shapes the mythology of British aviation; despite the vastly greater resources devoted to RAF Bomber Command (offensive), the popular symbol of the RAF's Second World War is the (defensive) "Fighter Boy" in his Spitfire.

Although the text is largely unchanged from the first edition (which Edgerton has placed online), it remains a bracing and stimulating read. If it is less shocking than when it was first published, this is a measure of how our analyses of the relations between industry, the military and science and technology have fallen into step with its arguments. This edition has the major advantage of an updated bibliographic essay, which covers most of the important work published since 1991. In any case, *England and the Aeroplane* should be required reading for any serious student of British aviation.

**JAKOB WHITFIELD**



## **Churchill and his Airmen: Relationships, Intrigue and Policy Making 1914-1945**

By Vincent Orange; Grub Street, 4 Rainham Close, London SW11 6SS; 6¼in x 9½in (158 x 241mm); hardback; 330 pages, illustrated; £25. ISBN 978-1-9081-1736-6

MY INITIAL IMPRESSIONS of this book were not too good. Why is it that, when learned professors write about aviation history, they often seem to care and know little about the aircraft themselves, even though they are an essential part

of the story? In the text I found a reference to "... two Sopwith squadrons, one equipped with the S.E.5a and the other with Pups ..."; this rankled, especially after the author had not hesitated to condemn the Royal Aircraft Factory's aeroplanes. Then, in the small 16-page section of black-and-white images in the middle of the book, I found a very poor image of the "Zeppelin LZ224, first flown in June 1908". That was evidently nonsense; it was the LZ4. On the facing page a study of an LVG C VI of 1918 was captioned as "A German LVG biplane, one of which made the first raid on London, 28 November 1916", while the machine in question was actually the very different LVG C IV, as the author states correctly on page 39, and it was the first *daylight* raid. Then there is a picture of a piloted V1 captioned as though it were the standard flying-bomb. On page 19 one finds two dates for the same event, Flt Lt Marix's bombing of the Zeppelin sheds at Düsseldorf; first October 8, 1914, which is correct, and then, four paragraphs later, October 9, which is wrong. These might be small points but they matter, as they reflect poorly on the book as a whole.

Nor was I very happy to see Churchill lauded as "the father of naval air power" and "the onlie [sic] begetter of the [RNAS]", when the entire initial impetus behind getting the navy flying was down to one rich civilian who, as early as 1911, lent his aeroplanes freely for the training of the first naval aviators, ensured that the Royal Aero Club's pilots trained them at Eastchurch, and barracked the government for recognition of the potential of air power at sea. Sadly the name of Frank McClean appears nowhere in this book and one is led to believe that Churchill did it all, whereas his role was essentially a political one.

Nonetheless, Churchill was an inspirational



figure who staunchly supported the independence of Britain's flying services over a period of many years. His great capacity for work ensured that "his" airmen were given due recognition, and this they appreciated. This book examines the many and varied (and sometimes tempestuous) relationships he enjoyed with the leaders of the flying services.

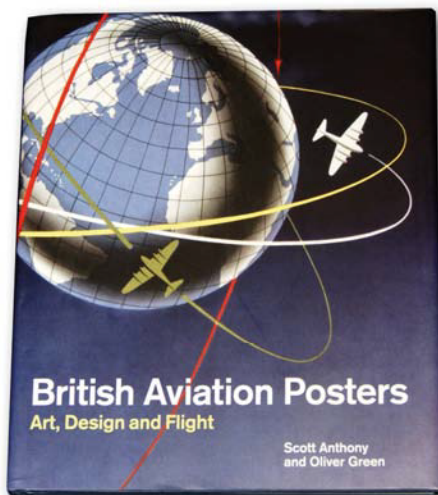
The author makes some interesting observations on other aspects. For example, although Churchill had firmly supported the policy of "area bombing" which had resulted in the raids on Dresden during the Second World War, he subsequently issued a minute questioning the conduct of Allied bombing, but was obliged by "Bomber" Harris and the Air Staff to issue a retraction of this politically expedient about-turn.

The monumental six-volume work *The Second World War*, for which Churchill, the attributed author, headed the research team, is described by Professor Orange as "... an extended essay in self-vindication, tempered to some extent by the arguments and objections of those who researched on his behalf". Orange says that "Both Churchill and his aides enjoyed the advantages of hindsight and tailored what they wrote to suit current political interests", adding that two of those involved, who were successive secretaries of the Cabinet, "ensured that no other writer had equal access to official records". It is hoped that this will lead future historians to treat the work with due caution.

As Orange observes, Churchill was "always at heart a politician and a man obsessed with his reputation", and was quite prepared to change horses as circumstances demanded. He evidently needed to be in control, even when writing history, and was also happy to prophesy and pronounce on future developments — and did so profusely. Although he was often wrong, he doubtless knew that at least some of the predictions would prove to be right in hindsight and reflect favourably on him.

This book has a bibliography, but given the quantity of attributed quotations it contains I would have also expected chapter notes or endnotes, but there are none.

PHILIP JARRETT



## British Aviation Posters: Art, Design and Flight

By Scott Anthony and Oliver Green; Lund Humphries, Wey Court East, Union Road, Farnham, Surrey GU9 7PT; 9in x 10½in (228mm x 267mm); hardback; 200 pages, illustrated; £35. ISBN 978-1-84822-084-3

IN HIS LECTURE on BOAC and its post-war legacy at the Royal Aeronautical Society in London in October 2013, former airline pilot and TAH Editorial Board member Dacre Watson put forward the notion that the

chief beneficiaries of BOAC's blueprint for a modern post-colonial airline were the newly-minted post-Empire nation states able to exploit the Corporation's infrastructure to establish their own lucrative networks from their subsidiary beginnings. Captain Watson went on to say that BOAC's direct descendant, British Airways, inherited very little other than its distinctive "Speedbird" radio callsign and a world-class archive of photographs and memorabilia. And it is the latter that is the basis of this extremely handsome tome, put together under the auspices of its chief curator, Paul Jarvis, and his dedicated team of archivists at BA's headquarters at Waterside, near Heathrow.

Having been introduced to the stunning collection of original posters kept at Waterside, authors Scott Anthony (who writes regularly for *The Guardian*) and Oliver Green, former Head Curator at the London Transport Museum, set about surveying the golden age of British aviation advertising, which called on the talents of a group of artists and designers whose names were to become legendary in commercial design; from the masters — Abram Games, Edward McKnight Kauffer — to the lesser-known but equally influential — Ben Nicholson, F.H.K. Henrion, Mary de Saulles *et al* — the narrative provides context for the magnificent artwork on show. The story is told largely through the development of the airline ancestors of British Airways, which co-produced the book, but this is no criticism; Imperial Airways, BEA and BOAC all recognised the power of a memorable image, and consistently produced dazzling examples of the art of the perfect poster. This beautifully-produced catalogue of national treasures will provide a lifetime of pleasure and inspiration.

NICK STROUD



# Lost & Found


**PHILIP JARRETT** explores the lesser-known corners of aviation history, discovering unknown images and rediscovering long-lost details of aircraft, people and events. Here he investigates a pair of postcards featuring two somewhat-the-worse-for-wear S.E.5as

**T**HESE TWO POSTCARDS of crashed Royal Aircraft Factory S.E.5a fighters both came without any information. The first, depicting Vickers-built C5316 apparently after an encounter with a fence, reveals some interesting details. A camera-gun is mounted on the upper-wing Foster mounting, suggesting that the aircraft was serving with a training unit. Records state that its allotment to the Expeditionary Force was cancelled on November 6, 1917, but give no further details. However, the marking "B I" behind the fuselage roundel is very similar to the "B II" marking carried by another S.E.5a, B660, which appears in a crash picture in John Connors's book *S.E.5a in Action* (Squadron/Signal publication No 69), in which it is said the aircraft is "believed to be of No 56 Sqn".

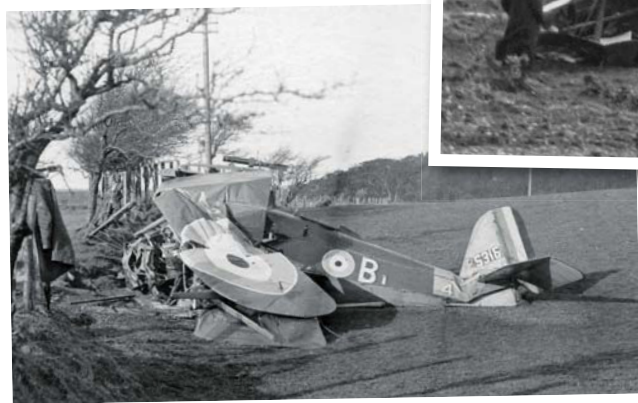
As this machine is also fitted with a camera-gun it seems unlikely that it was in squadron service, and indeed, the serial records state that B660 was with No 1 School of Aerial Fighting (No 1 SoAF) at Ayr in Scotland by February 1918 and until about mid-April that year. Another distinctive feature of C5316 is its light-coloured rear fuselage, fin and

tailplane, a feature apparent in a photograph of a line-up of No 1 SoAF S.E.5as published in Air-Britain's *The S.E.5 File*. So it seems fairly certain that the shot of C5316 was also taken at Ayr, although further details are lacking.

The other crashed S.E.5a, C1134, served at the Royal Aircraft Establishment (RAE) at Farnborough, having been built in the factory there, and was used for various tests from late October 1918 until March 1919, undertaking tests of the Hart variable-pitch propeller, engines, oils and oil tanks, and radiators. It also performed air sampling and a "gliding test", and spent some time with No 1 (Southern) Aircraft Repair Depot, also at Farnborough, where it was flown by Maj Norman.

The last recorded entry for C1134 in the RAE Farnborough Flight Books at The National Archives is for March 27, 1919, when the weather was "rough" with a south-westerly wind. Civilian pilot Mr Fender, who had previously served as a passenger or observer during RAE trials, took off in C1134 at 1200hr for an "oil test". The entry ends with the terse comment "smashed": presumably the event depicted on the postcard. 

**RIGHT** *Upside-down in what looks like an allotment, apparently on March 27, 1919, S.E.5a C1134 was probably written off. The precise cause of the accident is as yet unknown, but the aircraft appears to have overturned during a forced landing on rough ground, possibly as a result of engine failure. If readers know any more, letters to the Editor please!*



**LEFT** *A collision with a fence has almost certainly rendered S.E.5a C5316 a write-off. It is not known whether its unfortunate pilot escaped unharmed. The "B I" marking aft of the fuselage roundel suggests that the aircraft may have been serving with the No 1 School of Aerial Fighting at Ayr. If you know more about the incident, do let us know!*



*One of 100 Lancaster Mk Is built during February–August 1945 by Vickers-Armstrongs at Castle Bromwich, G-AGUM was initially given the RAF serial PP751. Converted for civil use by Avro, the aircraft was fitted with the Lancastrian's elongated freight nose, but lacked the latter's windows and faired tailcone.*

RICHARD T. RIDING COLLECTION



# TERMINAL VELOCITY

**AVRO LANCASTER PANNIER TRIALS,**

**FARNBOROUGH, MAY 1949**

Following post-war service as a freighter and mail-carrier with British South American Airways, Avro Lancaster G-AGUM was sent to Airtech to be fitted with a huge ventral pannier in 1949. **GRAHAM SKILLEN** takes a look at the Air Registration Board's official report on this long-suffering Lanc's somewhat hairy and — unsurprisingly — short-lived trials



**A**VRO LANCASTER G-AGUM (formerly Lancaster I PP751) was one of several converted for civilian use after the war, the work being completed at Bracebridge Heath near Lincoln by A.V. Roe, for the British South American Airways Corporation, which intended to use them as freighters. They were fitted with the longer Lancastrian nose and a slightly bulged bomb bay, G-AGUM receiving its Certificate of Airworthiness (C of A) in May 1946 and being named *Star Ward*. The Lancasters were not economical, however, and were soon withdrawn from service, some being broken up.

Lancaster G-AGUM survived and went to Airtech Ltd at Thame, Oxfordshire, for the design

and development of a ventral pannier, the impetus being an urgent need for freight capacity into Berlin. The West was determined not to give in to the Soviet Union's demands for control of the western sector of Berlin, despite its closure of ground transport links in June 1948. The ensuing effort to feed the population of Berlin engendered an invaluable development phase for post-war airlines and their equipment, which led to the Soviets eventually giving in on May 12, 1949.

So, although the Berlin Airlift had been an unqualified success, there was a residual fear that a similar closure could happen again, so work on freight aircraft development proceeded apace. By May 1949 G-AGUM had been flown from Thame to Farnborough with its new pannier fitted and was waiting for an airworthiness flight test by the Air Registration Board (ARB) before reissue of the aircraft's C of A.

### THE PLAN

The aircraft was tested twice with the pannier; on May 27, 1949, between 1330hr and 1545hr and again four days later between 1700hr and 1745hr, both flights under the command of Capt Hood of British American Air Services, accompanied by Colin Black of the ARB, acting as Flight Test Engineer. For a test flight of this nature the programme would be agreed before flight and would comprise tests of handling qualities and performance likely to be affected by the aircraft's radical modification.

Black wrote the report, although normally this was a joint effort involving the pilot, as he ultimately had the decision on the standards achieved; but, as Black noted at the time of writing, he was "awaiting receipt of notes made by Capt Hood". These were apparently not forthcoming "so the report records the impressions of the observer". One wonders why — but then, if you read on, Hood's position may become clear.

**Lancaster G-AGUM with the inelegant ventral pannier fitted by Airtech at Thame. The pannier was approximately 8ft x 8ft (2.4 x 2.4m) in section and 20ft (6m) long. Of parallel box section, it had a rounded nose which formed a pair of doors, and a tapered tail.**

RICHARD T. RIDING COLLECTION







The aircraft was flown at 65,000lb (29,480kg), the normal maximum weight, but with the centre of gravity (c.g.) somewhat aft of normal. This means either that a clearance for a revised c.g. was needed owing to the pannier installation, or that a handling check under that condition was likely to be more extreme than anything that would be found in service.

No specific performance climb tests were made, the operating weights being unchanged from the standard Lancaster. Of course, there would be a drag increase with the pannier, but seemingly it was thought that if it flew all right with adequate climb after take-off, then it was good enough for the critical Berlin situation. A set of tests cutting the engines at take-off power during the climb was completed, in effect simulating the loss of an engine at take-off, and while the aircraft was OK generally, having some residual rate of climb, the minimum speed at which controllability in the air could be maintained ( $v_{MCA}$ ) was not. A standard Lancaster operating at 3,000 r.p.m. and +18lb/in<sup>2</sup> boost with the port engine cut at 3,500ft had a  $v_{MCA}$  of 145kt, while for G-AGUM it was 60kt higher at 205kt.

Tests were flown at 3,500ft, as detailed above, 5,000ft at 3,000 r.p.m. with +12lb/in<sup>2</sup> boost and at 6,000ft at 3,000 r.p.m. with +9lb/in<sup>2</sup> boost, the crew finding that at the higher altitudes the  $v_{MCA}$  dropped, but that at 6,500ft the aircraft could no longer climb and any height lost during manoeuvring could not be regained. The aircraft clearly needed more fin area, this being fairly

typical where keel area is added forward of the wing, such as with the Lancaster/York and de Havilland Comet/Hawker Siddeley Nimrod.

### **SIDESLIPS AND DIRTY DIVES**

Next up on the test programme were some sideslips. These are undertaken to check the basic stability of the aircraft such that, for example, it can be flown in turbulence without problems. When releasing the controls in a sideslip the aircraft should return to normal straight-and-level flight. These tests also show whether there is any control overbalance; for example, the rudder sticking on and having to be forced off — not a fun situation if unexpected.

The crew found that G-AGUM needed very little rudder to sideslip the aircraft, but full aileron. Performing the test at 130kt with the flaps retracted resulted in some pre-stall buffet, which was slightly worrying as the power-off stall speed for a standard Lancaster was 105kt. Somewhat surprisingly, proper stall tests were apparently not performed. The modification was massive, and the stall speeds would almost certainly have been different, not to mention airspeed errors as a result of the awkward fuselage shape.

The *dénouement* of the programme came around 40min into the flight on May 31, with a “dirty dive”, as it is termed in the trade. This is a test of the structural integrity of the modification by taking the aircraft up to its maximum permitted speed. The *Pilot's Notes* for the Lancaster give this as 315kt, but the report refers to “its normal

***One of the few photographs taken of G-AGUM with its short-lived Airtech pannier. It is not known whether this was taken at Thame during the pannier's fitting or at Farnborough during the trials. By the end of 1949 the aircraft had been scrapped at Dunsfold. No pictures have been traced showing the pannier after its blow-out — if you know of any, the Editor would like to see them!***

DICK BEDDOES VIA IAN OTTAWAY



**The Lancaster during the trials. Named Star Ward, G-AGUM had operated with British South American Airways from 1946, carrying perishable goods on long routes over the South Atlantic. The pannier was designed to have a capacity of some 1,000ft<sup>3</sup> (28m<sup>3</sup>) and be able to carry a load of 10,000lb (4,535kg).**

DICK BEDDOES VIA IAN OTTAWAY



limiting speed" of 278kt. This test is usually flown at the end of a programme and preferably over the base airfield, in case of emergencies.

Hood commenced the dive from a level speed of 180kt. By the time the Lancaster had reached 200kt the force on the control column had lightened, and "as speed increased became a gentle pull". At 260kt, with 18kt still to go, the nose of the pannier, directly beneath the crew's feet, blew in, the air pressure blowing the sides of the pannier out, "leaving the floor and parts of the sides still attached to the aeroplane". Pieces of the wreckage damaged the port fin. There was an increased nose-down pitch and severe buffeting, and the drag was such that climb power on all engines and full flap was needed to maintain the

approach to Dunsfold, which was the nearest airfield and directly ahead.

Needless to say, the project was abandoned, Colin Black noting that even if they had continued it was unlikely that the standard found would have been acceptable. It only remains to add that inside the formality of the official report Black saw fit to record the acerbic comment made by Hood while crossing the hedge at Dunsfold: "Life gets rather tedious, doesn't it?"



#### ACKNOWLEDGMENTS

The Aviation Historian would like to thank Ian and Susan Ottaway and Richard T. Riding for their invaluable help with the preparation of this feature



#### FROM SIDESLIP TO STOWAWAY

FOLLOWING G-AGUM's pannier trials at the end of May 1949, the aircraft was returned to service as a freighter and mail carrier, before being dismantled and scrapped at Dunsfold in December the same year. The pannier-shredding incident was not to be the Lancaster's last taste of drama, however.

The October 13, 1949, issue of *Flight* reported that "at Wealdstone on October 4, Robert Green, a 22-year-old student, was accused of having 'committed an act likely to imperil the safety of an aircraft, to wit, Lancastrian [sic] G-AGUM, by stowing away thereon'". The case was thought to be the first of its kind to come before a British court.

The *Flight* report continued: "Capt G.M. Alcock gave evidence that on taking off for the Azores on a freight and mail flight on August 26, Green's presence in the tail had upset trim and considerably increased his take-off run. He also stated that the compass might easily have been affected and that there was a risk of control cables being jammed".

Green, who claimed to have 110hr of flying experience, was sentenced to three months' imprisonment, which, on appeal, was commuted to a £50 fine, although the conviction was upheld.





AUTHOR'S PHOTOGRAPHS

# OFF THE BEATEN TRACK

Ever turned a corner to find something unexpected? The Aviation Historian's intrepid aeronautical explorer **PETER DAVISON** investigates the stories behind the oddities that turn up in the most unusual places

**"M**AYDAY, MAYDAY!" calls Capt Sparks as this Lockheed PV-2 Harpoon crash-lands on an idyllic island paradise that just happens to feature a crazy golf course, at North Myrtle Beach, South Carolina. The myth continues: the passengers and their golf clubs have survived despite the attendance of a rescue Bell Huey that hovers over the course, the downdraught no doubt disturbing their swing.

The PV-2, N72707 (c/n 15-1458), was delivered to the US Navy in November 1945 as BuNo 37492 and, with low hours, gained a cargo door in 1960 and a conversion for cropspraying ten years later. After service in Montreal it was stored, with many others, at Mesa, Arizona, in 1976 and was seen there by the author in 1979.

By 1986 the Harpoon, one of more than 500 examples built, was selected for restoration as an airworthy warbird and was seen as such in 1993, although a minor crash in 1994 at Arcola, Texas, ended its flying career. The creators of Mayday Golf evidently thought the sight of a Harpoon would encourage visitors to put a hole in one — in strictly golfing terms, of course!



**ABOVE** *Bogey or Eagle? Lockheed PV-2 Harpoon N72707, formerly BuNo 37492, sets the golfing castaway scene at Mayday Golf in North Myrtle Beach, South Carolina. To see the Harpoon from above, put co-ordinates N33.834898, W78.672735 into the "Fly to" box in Google Earth.*

**BELOW** *Continuing the castaway theme is a Bell UH-1 helicopter "looking for survivors" — the identity of the machine is unknown.*



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**Sabena's Cityhoppers** Belgian aviation specialist Bob Rongé details the airline's innovative use of helicopters on its European inter-city services

**Pearse de Résistance** Richard Pearse said he never flew, while others say he beat the Wrights into the air; Errol Martyn confronts a first-flight myth and much more . . .



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